



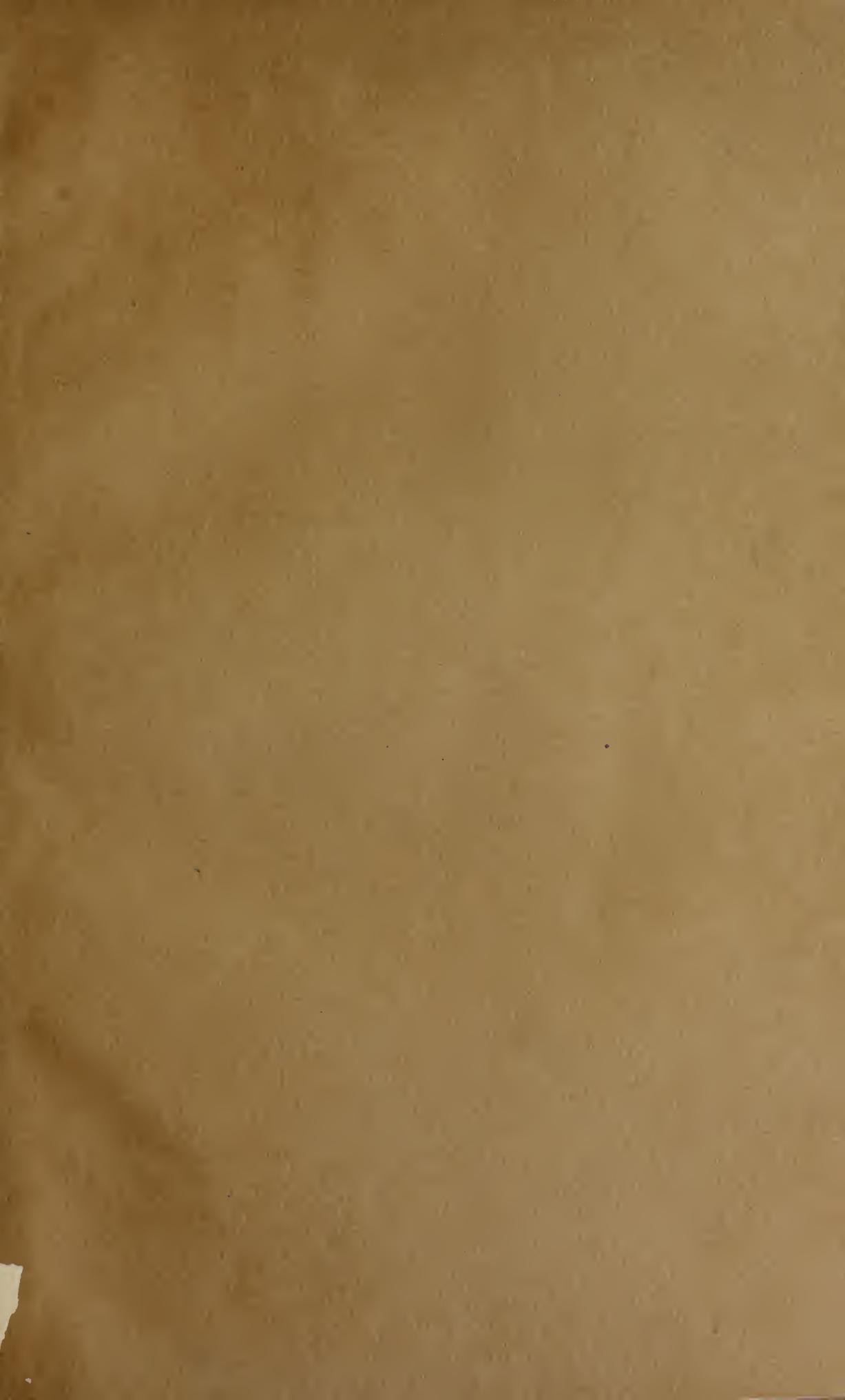
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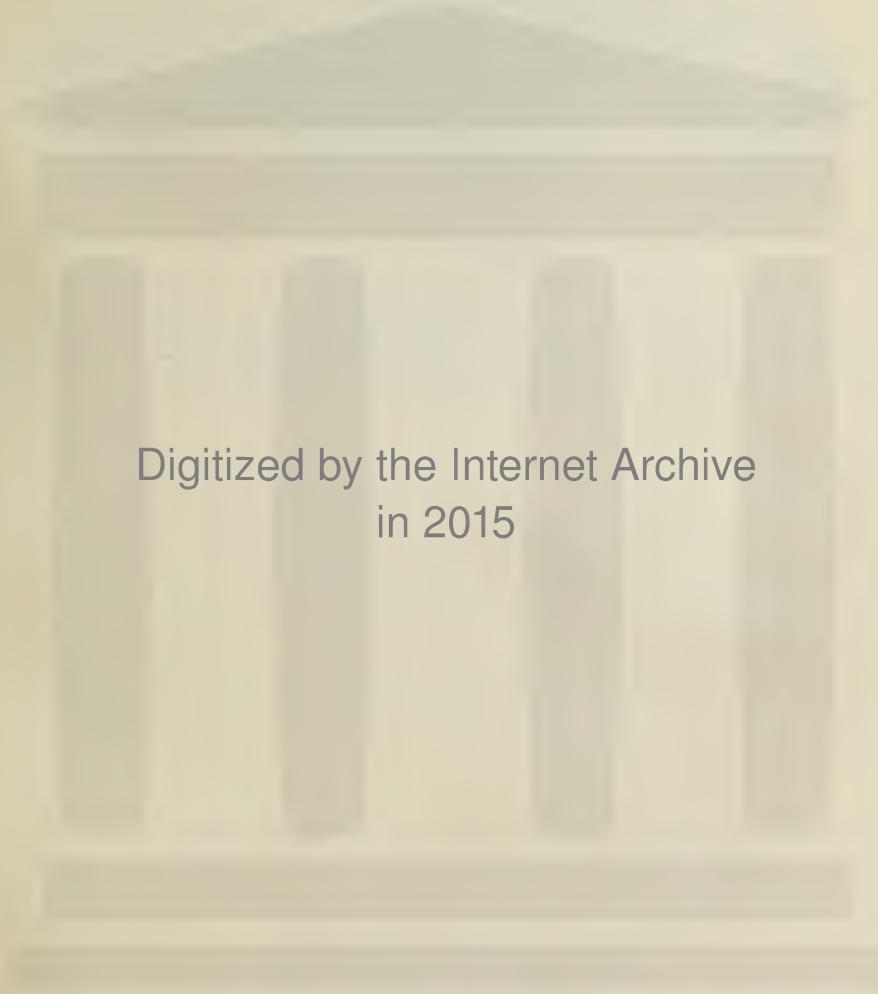
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PRISE MEDALS AWARDED.

Patent Wood-Working Machinery,

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J. A. FAY & CO.

CORNER FRONT AND JOHN STREETS,

CINCINNATI, OHIO, U. S. A.

1878.

T.C.
850
T.R.
1878

STRUCTURAL WOODWORK
AND EXCAVATION

CINCINNATI:

LINE PRINTING WORKS,
8 E. Fourth Street.

 Dedicated

TO ALL WHO ARE INTERESTED

IN

WOOD-WORKING MACHINERY

IN

AMERICA, EUROPE, ASIA, AND AUSTRALIA,

BY

J. A. FAY & CO.

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J. A. FAY & CO.'S WOOD-WORKING MACHINERY

HAS BEEN AWARDED OVER 300 GOLD, SILVER, AND BRONZE MEDALS.

The International Expositions of United States, France, Vienna, Chili, Australia, the American Institute, N. Y.; also, the Industrial Expositions of Cincinnati, Boston, Chicago, St. Louis, Pittsburgh, New Orleans, and San Francisco have awarded Special Premiums of Gold, Silver, and Bronze, and Complimentary Medals of Gold, and Honorable Mention.

Suggestions to Purchasers and Correspondents.

WHEN ordering machinery, specify distinctly the articles wanted, and also your full address—town, county, and state.

Remittances may be made either by Draft, Express, or (if in small amounts) by Postal Orders. Drafts should be made payable to our order, and drawn either on Cincinnati or New York. Express remittances should be plainly marked, and in all cases prepaid.

Sterling Drafts are invariably sold at the highest premium attainable, and the amount placed to the customers credit.

In the absence of instructions, machines will in all cases be understood to require boxing, which will be charged at cost.

Preferred routes of shipment should be plainly designated; otherwise they will be forwarded by the cheapest and most expeditious route.

Insurance and freight contracts, by the best route, will be secured at the lowest possible rates, when so desired.

Each machine is furnished with tools complete as specified in description.

Describe parts of machines wanted for repairs as explicitly as possible, and in all cases where practicable return the old parts, or send us sketches of same, in order to obviate liability of mistakes.

In ordering pulleys, state the diameter, width of face, and exact size of bore wanted, also whether they should have flat or crowning face.

In ordering gearing, the exact diameter, width of face, number of teeth, and size of hole should be given.

When circular saws are wanted, state whether for ripping or cross-cutting, and give diameter, size of hole, gauge, and style of tooth.

In ordering scroll saws, state the length and width, and whether required for the fret or unstrained scroll saw.

In ordering band saws, specify the length and width, what machine they are for, and whether or not they should be filed, set and brazed.

In ordering auger bits, state the diameter and length of the twist and shank, respectively.

Introductory.

IN offering this catalogue of our manufactures to the users of wood-working machinery, we deem it essential to state that we have, as occasion required, issued circulars of special machines at the time of their production, or catalogues of classes, to meet the wants of the respective trades to which they were adapted. These methods of information we will continue when necessary, as, from past experience, we are aware that changes and improvements must continue while machinery is in use, as new methods and systems are adopted by operators, necessitating new combinations to produce the desired result.

Since issuing our last large illustrated catalogue, the number of our machines has been increased to about two hundred. These will be found in detail in this enlarged illustrated and descriptive volume, with information regarding their function and product. With the aid of this catalogue parties desiring to purchase wood-working machinery can select intelligibly sets for use in almost any branch of wood production, and attention will be given to suggestions for the completion of any special operation in any of such sets.

In manufacturing we have spared no expense in increasing our facilities; and in designing, improving and constructing; the best methods are adopted, and systems established for uniformity of sizes. Particular attention is given to perfectly balancing the revolving parts, and thoroughly fitting the journal bearings.

Our workmen being in special corps, under the supervision of men accustomed to their class of work, and from long experience and particular attention to each detail, enables us to provide machinery constructed upon the most approved plans, and with a certainty that it will operate in the most perfect manner.

Our experimental department is in the charge of competent experts, who are required to test in the most critical manner every machine and process, and assurance is given that each article is as nearly as possible in perfect working condition.

While we ask no one to purchase patent rights, but include in our prices the right to use in any section of the country, we find it necessary to protect ourselves with letters patent against parties who scruple not to use the designs and improvements of others without permission, so far as they can do so without incurring the penalty of the laws. While upon the whole our rights have been respected, we have, in some instances, been compelled to appeal to the law for protection, a course that will uniformly be pursued in all cases where our patent rights are infringed.

We invite special attention to the improvements we have effected in special machinery for car manufacturers and wheel work; also in our patent planing and matching

machines, molding and mortising machines, band saws and sawing machinery, universal and variety wood-workers, wheel machinery, etc., full descriptions of which will be found in their appropriate places. We are proud to state that every machine described in this catalogue is of our own manufacture.

The world-wide reputation attained by our machinery is one of the many evidences of its superior excellence, and its appreciation everywhere will be seen from the fact that it is now in use, and shipments constantly made to, Great Britain, Ireland, Germany, Switzerland, Sweden and Norway, Russia, Australia, New Zealand, Japan, South America, West India Islands, and all the States and Territories of the United States.

In our competition for excellence at the numerous Expositions that we have attended with our machinery, we have, in all cases, received the highest awards, and especially at the World's Expositions at Vienna, 1873, at Santiago, Chili, 1875, at the Centennial Exposition of the United States, at Philadelphia, 1876, also the New South Wales Exposition, Australia, 1877. We have at the World's Exposition at Paris a large display of new wood-working tools, to which the attention of visitors there is called, and the result, as to the award, by the world at large.

With unequalled designs, new patterns and tools, complete systems in our works, long experience and careful attention to business, we hope in the future, as in the past, to maintain the high reputation of our machines at home and abroad, and merit a continuance of the very generous patronage hitherto received.

W. H. DOANE, President.

J. A. FAY & CO.,

D. L. LYON, Secretary.

Cincinnati, Ohio, U. S. A.

June 1st, 1878.

Wood Working Machinery.

IN no kind of machinery is perfect construction more essential than in wood-working machinery. The high speed of movement requires all parts to be finished in the best manner to prevent friction and the ruinous results to the parts affected. Wood-working machinery cutters act in true geometrical lines, and with a power and speed limited only to the safety of the tool and machine, and with an accuracy of result not attainable by hand labor, which is limited in its force, easily exhausted in its power, and unreliable in the accuracy of the product; the production from the machine being duplicates, that from hand labor only approximates.

"Labor Saving" is the profitable result of the use of wood-working machinery, and relieves man from some of the most exhaustive labor in the development of the productions from wood, leaving to him the manipulation of the machine and the more artistic portions of the work, placing the artisan more in the field of intellectual than physical labor. Wood-working machines should be complete in detail, and have every convenience for carrying their functions into operation; they should do the largest amount of work in the best manner and without loss of time. Machinery possessing the reverse of these qualities, or the above qualities in an inferior degree, being incomplete in construction and imperfect in action, possess little, if any, advantages over hand labor.

The value of a machine in its results, as compared with the results of hand labor, is the measure of value of such machines; and, considering the quantity and quality of work produced by either system, gives a true basis whereby their relative values may be estimated. It is not only essential that a machine should perform a specific work, but that it should be performed in the best manner and in the shortest time, giving a maximum of product for a minimum of labor.

In making an estimate of the economy in the use of wood-working machinery, it is difficult to establish a basis of calculation; yet if the result from one machine and one man is more than that from the labor of three men, unaided by machinery, it is evident that the labor of two men is saved, and from this it will be seen that a machine will soon repay its original cost; and from the cheapening of the product there will result a greater demand.

It is desirable to consider the motives governing parties when purchasing machinery. It is difficult for a purchaser to see that a small extra cost at first, may, in procuring for him a superior machine, be beneficial in the subsequent profit by the superior excellence of its action and small cost for repairs. It is, therefore, apparent that the worth of a machine is according to the cost of its operation and maintenance; and the relative value with any other must be contrasted and compared upon this basis.

Evidently, machines sold at small prices can not always embody all the desirable excellencies of first-class machines; hence, it will also be evident that a first-class price must be paid for first-class machinery; and when we consider that they embody the result of long experience and thorough knowledge of the requirements, and contain not only the completeness of detail, but also substantial and perfect construction to produce the best results, it will be seen that machinery constructed upon this basis can not be sold at prices which will not insure these features in their production.

Rules for Ascertaining the Speed of Pulleys.

PROBLEM I.

The diameter of the driven being given, to find its number of revolutions:

RULE:—Multiply the diameter of the driver by its number of revolutions, and divide the product by the diameter of the driven; the quotient will be the number of revolutions of the driven.

PROBLEM II.

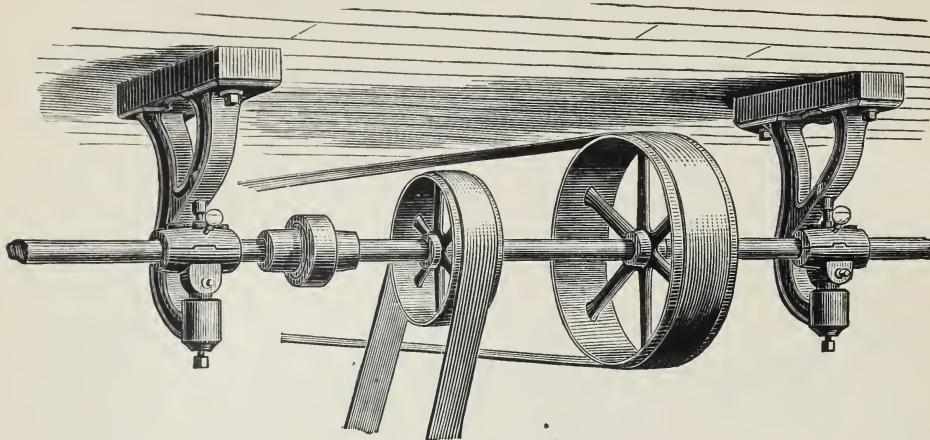
The diameter and revolutions of the driver being given, to find the diameter of the driven, that shall make any given number of revolutions in the same time:

RULE:—Multiply the diameter of the driver by its number of revolutions, and divide the product by the number of revolutions of the driven; the quotient will be its diameter.

PROBLEM III.

To ascertain the size of the driver:

RULE:—Multiply the diameter of the driven by the number of revolutions you wish it to make, and divide the product by the revolutions of the driver; the quotient will be the size of the driver.



Section of Line Shafting.

(WITH PATENT SELF-ADJUSTING PIVOT HANGERS, PATENT COMPRESSION COUPLING AND PULLEYS.)

THE second element in machinery is the means for the transmission of power from the motor to the machines. This is almost universally accomplished by lines of shafting extending through the different rooms and stories of mills and manufactories, and constituting, as a single article, one of the most important of machinery manufacture. As originally made it was clumsy, with solid couplings, keyed on firmly, and with rigid bearings that were with difficulty got into line, supported by hangers and brackets containing an amount of metal not required for the strain upon them.

But a more scientific mechanism has now replaced these rude appliances, and shafting, to meet the conditions of modern improvement, must be turned perfectly true, fitted to standard gauges, the bearings must pivot in all directions, and have vertical and lateral adjustment upon their supports, and contain self-lubricating devices.

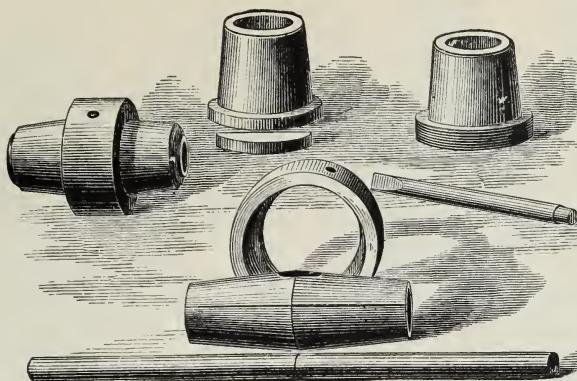
The hangers and supports, constructed with variety of design, are so arranged as to give the greatest strength with the least amount of metal.

The couplings must be so constructed as to be readily attached and removed without drifting out keys, and replaced without injury to the shaft or coupling.

Pulleys must be turned and balanced, and contain the right amount of metal in the right place.

Persons purchasing shafting should see that all of these conditions, and which are all found in J. A. Fay & Co.'s patent hangers, couplings, pulleys, etc., are filled, for shafting, like all other machinery, has a price to correspond with its character.

The pulleys should be light and of the most approved construction, designed especially for wood-working machinery.



Patent Adjustable Compression Couplings.

The above engraving gives a correct representation of our finished coupling, ready to go on the shaft, and also of the different parts which form the whole, thus plainly showing the simple plan of its construction. The advantages over the ordinary coupling will be seen by a comparison.

By the aid of special tools we are enabled to manufacture and furnish them at about the same price as the ordinary style coupling. With the convenience of being easily attached or removed, they have the following advantages over others of the same class:

1st. The strength of the couplings is in its outer shell, where it can best withstand the strain.

2d. It is formed with less metal than any other coupling, and is symmetrical in its appearance.

3d. The coupling force is the same on each end of the shaft.

4th. The cones being moved by a ring-nut, keeps the shaft in a true line.

5th. The sleeve is thin and flexible, and closes concentrically upon the shaft, and not as two semi-circles in couplings where a heavy cone is used.

This coupling consists of four pieces; its plan of construction being plainly shown in above cut. In attaching the coupling, where great strain is required, the cones should be driven up in addition to the power of the nut. To remove, turn off the ring-nut and drive a wedge between the flanges.

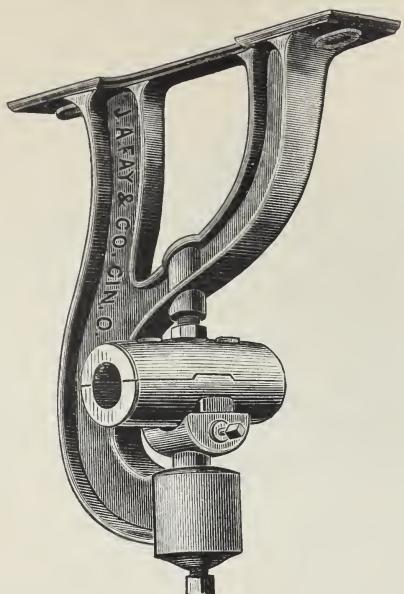
These couplings are bored to fit U. S. standard calliper gauges, and consequently we are able to duplicate any parts of shafting, pulleys, hangers, or couplings at any subsequent time, and guarantee perfect fits.

They hold the shafts perfectly secure, are not liable to get out of order, and in the numerous large establishments where we have furnished them they have not once failed to give entire satisfaction.

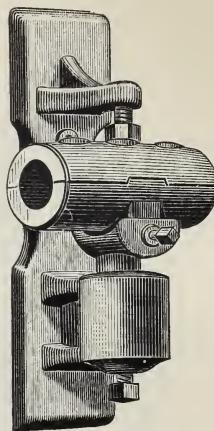
In addition to the sizes enumerated hereinafter, we are prepared to furnish our patent couplings, adapted for 2, $2\frac{1}{4}$, $2\frac{1}{2}$, and 3-inch cold rolled shafting, at same prices as the corresponding sizes for turned shafting.

SIZES OF PATENT COMPRESSION COUPLINGS.

$1\frac{11}{16}$	$1\frac{15}{16}$	$2\frac{3}{16}$	$2\frac{7}{16}$	$2\frac{11}{16}$	$2\frac{15}{16}$	$3\frac{3}{16}$	3 $\frac{7}{16}$ in. diameter.
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DROP HANGER.



POST HANGER.

Patent Self-Adjusting Pivot Hangers.

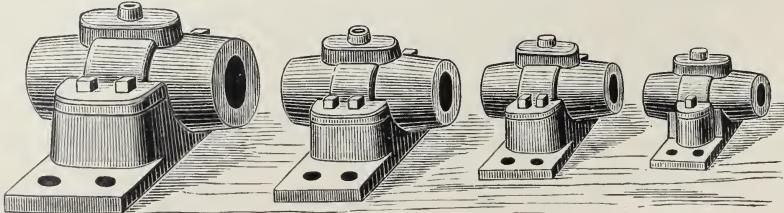
The above engravings clearly show the advantages of our patent self-adjusting pivot drop and post hangers, which are so constructed as to secure the greatest strength.

They are conceded to be the most perfect adjustable hangers in use, having heavy bearings pivoted in all directions, so that the shaft can be adjusted vertically or laterally by means of screws, independent of the hanger plate. This enables the shaft, when out of line, to be almost instantly adjusted without moving the hangers.

The bearings are self-lubricating, and drilled to receive oil globes, and will save nearly four-fifths the usual cost of oil over the old style of hangers. These several improvements are found only in the J. A. Fay & Co. hangers, and are secured to us by letters patent.

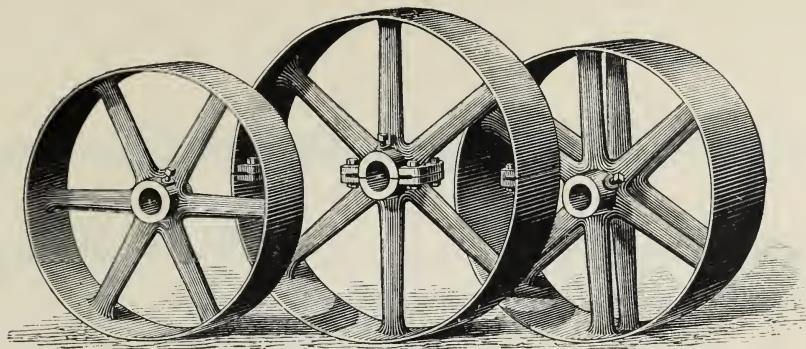
By reason of their peculiar construction, and having added special tools for making them, we are enabled to furnish these patent self-oiling adjustable hangers with our patent couplings, pulleys, and shafting at the lowest market prices.

We can furnish the following sizes of these hangers, viz: drop hangers, with 22, 18, 16, 13, and 11 inch drop; post hangers for $3\frac{15}{16}$, $3\frac{7}{16}$, $3\frac{3}{16}$, $2\frac{15}{16}$, $2\frac{11}{16}$, $2\frac{7}{16}$, $2\frac{3}{16}$, $1\frac{15}{16}$ shafts.



Rigid Journal Boxes or Pillow Blocks.

These boxes are designed for use where a line of shafting is to be placed on the floor or under the floor on beams, or in any position where a support can be furnished. They can be used in many positions where the drop or post hanger would not be practical. They are furnished with the same lubricating device as our drop and post hanger boxes, and have large oil cups on the caps to receive tallow. They are furnished for the same sizes of shafts as the drop and post hangers, viz: $1\frac{11}{16}$, $1\frac{15}{16}$, $2\frac{3}{16}$, $2\frac{7}{16}$, $2\frac{11}{16}$, $2\frac{15}{16}$, $3\frac{3}{16}$, $3\frac{7}{16}$, $3\frac{15}{16}$ diameter.



Straight Arm Pulleys.

Three forms of our pulleys are represented in the above engraving, viz: with double arms for heavy main drivers; made in halves for appliance without removing the shafts; and with single arms for all ordinary requirements.

Our pulleys are constructed from new patterns of improved design, made from our own formula for correct proportion and weight, have straight arms, are of symmetrical shape, and especially adapted for fast-running wood-working machinery.

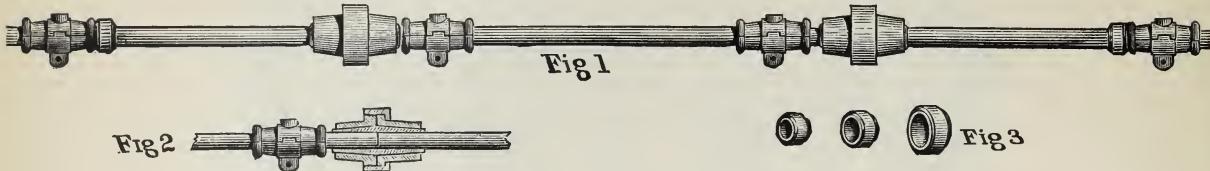
They are made from the best quality of iron, are bored to accurately fit shafts of standard gauges, perfectly balanced, turned, and set-screwed; and the metal being distributed in proper proportion, are unequaled as regards accuracy and strength.

Pulleys of each size are made with different sizes of hubs, according to the diameter of the shaft upon which they are to run, thus avoiding superfluous weight of metal when designed for shafts of small diameter.

Pulleys for shifting belts should have a flat face, and rounding face for stationery belts. In ordering pulleys, the diameter, width of face, and exact size of bore should be stated; also, whether they are wanted with flat or rounding face.

List of Sizes of Pulleys.

Diam.	Face.										
6	3½	10	4½	15	8½	20	14½	28	4½	36	10½
6	4½	10	5½	15	10½	22	3½	28	6½	36	12½
6	5½	10	6½	15	12½	22	4½	28	8½	36	14½
6	6½	10	8½	16	3½	22	5½	28	10½	36	16½
6	8½	10	10½	16	4½	22	6½	28	12½	38	8½
7	3½	10	12½	16	5½	22	8½	28	14½	38	10½
7	4½	12	3½	16	6½	22	10½	30	4½	38	12½
7	5½	12	4½	16	8½	22	12½	30	6½	38	14½
7	6½	12	5½	16	10½	22	14½	30	8½	38	16½
7	8½	12	6½	16	12½	24	3½	30	10½	40	8½
8	3½	12	8½	18	3½	24	4½	30	12½	40	10½
8	4½	12	10½	18	4½	24	6½	30	14½	40	12½
8	5½	12	12½	18	5½	24	8½	32	6½	40	14½
8	6½	14	3½	18	6½	24	10½	32	8½	40	16½
8	8½	14	4½	18	8½	24	12½	32	10½	42	6½
8	10½	14	5½	18	10½	24	14½	32	12½	42	8½
9	3½	14	6½	18	12½	24	16½	32	14½	42	10½
9	4½	14	8½	20	3½	26	4½	34	8½	42	12½
9	5½	14	10½	20	4½	26	5½	34	10½	42	14½
9	6½	14	12½	20	5½	26	6½	34	12½	42	16½
9	8½	15	3½	20	6½	26	8½	34	14½		
9	10½	15	4½	20	8½	26	10½	34	16½		
9	12½	15	5½	20	10½	26	12½	36	6½		
10	3½	15	6½	20	12½	26	14½	36	8½		



Directions for Laying Out and Ordering Shafting.

In the above illustration —

Fig. 1 shows proper relative position of couplings and bearings.

Fig. 2 shows sectional view of our patent couplings.

Fig. 3 shows our turned collars.

In laying out lines of shafting, the first section should be larger than the remainder of the shaft; this rule is to be considered with relation to the length of the line. The distance between the bearings that receive the motive power should be as short as convenience of placing them will allow.

By placing the bearings close together on the first length, it will be necessary to have three bearings for that length, unless it is very short, and the larger shaft should be turned down on the end to receive the coupling fitting the smaller size.

The couplings should be placed so that their centers are the length of the coupling from the end of the bearing—this is for convenience of removal of the couplings.

The bearings should not be more than seven or eight feet apart, and should be rigidly supported, to insure perfect alignment of the shaft; the collars, of which there should be at least two on the line, should be on the side of the hanger next outside of the last coupling on each end of the line of shafting, as shown in Fig. 1.

In ordering the lengths of shaft, they should be made to conform to the above conditions, or a diagram may be sent showing the position of the bearings, and the lengths will be made in accordance with such instructions.

On Selecting and Placing Line Shafting.

In the purchase of a line of shafting, it is of paramount importance that the liability of wrought iron shafts to spring when improperly weighted, inadequately supported, or of insufficient size, should not be overlooked.

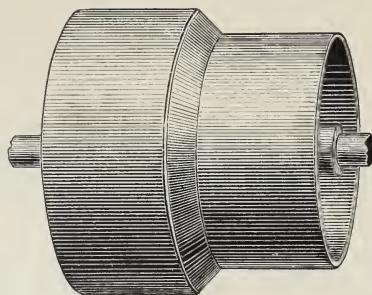
Shafting should be of a size proportional to the amount of work imposed upon it, and the weight of the pulleys it is intended to bear, and should have a sufficient number of bearings to insure its rigidity. Otherwise it will be liable to spring, requiring frequent lining up, and causing trouble and expense, which will more than balance the first saving in cost of a light and cheap line of shafting.

Where practicable, bearings should be placed at distances not to exceed seven or eight feet from each other, and the main driving pulleys should be placed between two bearings not further apart than four or five feet; and the different lengths of the whole line of shaft should be so estimated that, when coupled together, each coupling will come close to a bearing, as shown in the diagram on the opposite page.

In regard to the placing of pulleys, the usual and safest practical method is to place the heaviest strains nearest the bearings, leaving the unsupported parts to the lighter strains. The pulleys should be turned and balanced, and contain the right amount of metal in the right place.

Two or more collars should be placed on each line inside of the bearings nearest the couplings at each end, to prevent any end motion of the shaft. Bearings should be so constructed as to afford a constant supply of oil, and should be pivoted for lateral and vertical adjustments.

A line of shafting fulfilling these conditions will give entire satisfaction at all times, and require little or no repairing or replacing.



Patent Bevel Flange Loose Pulleys.

PATENTED SEPT. 25, 1877.

We have recently patented the arrangement of the tight and loose pulleys shown in the above illustration, and desire to call attention to the advantages to be derived from the method of their construction, and the economy in the wearing of both the loose pulley and the belt in their use. In the use of tight and loose pulleys of the same size, the tension of the belt is constant, and consequently the pressure produced upon the bearing of the loose pulley is so great as to make it practically impossible to keep the shaft properly oiled to prevent the results of friction upon the pulley and shaft.

This is especially true of loose pulleys used on wood-working machinery, owing to the high speeds and great power required to operate the machines to which they may be attached. The arrangement shown above entirely obviates these difficulties. The loose pulley is made smaller in radius than the tight pulley, having a beveled flange on the side toward the tight pulley, to guide the belt easily from one to the other.

The loose pulley being less in diameter than the tight one, relieves the belt from all strain while running on the loose pulley, and reduces the friction on the shaft of the loose pulley to that resulting from the weight of the belt only. This reduction of the amount of friction on the shaft from the pressure of the loose pulley, relieves the surface from the crushing effect to such an extent that the oil remains in the bearings, and the pulley remains in good condition with an ordinary amount of attention.

The benefits obtained by the belt are of value, as, in relieving it from the strain consequent upon a continued tension, the belt is given an opportunity to recover its elastic force, thus preventing the belt from so soon reaching the limit of elasticity, as after it has reached that point it deteriorates very rapidly. The belt is easier moved from the tight to the loose pulley, thus making it more easy to stop the machine when under full motion.

We are prepared to furnish any size that may be wanted to run either on new or old machines. Parties ordering will please give diameter, and width of face, and size bore of pulleys, when we can send the proper sizes ready to apply. All pulleys warranted to give satisfaction.

List of Sizes and Prices of Patent Loose Pulleys.

Diam.	Face.	Price.	Diam.	Face.	Price.									
6	3½	\$3 68	12	5½	\$5 50	16	10½	\$9 00	22	8½	\$11 10	26	12½	\$17 15
6	5	4 15	12	6½	5 85	18	4½	6 75	22	10½	12 80	26	14½	19 25
6	6	4 28	12	8½	6 60	18	6½	8 25	22	12½	14 05	28	6½	13 30
8	3½	4 00	12	10½	7 30	18	8½	9 85	22	14½	15 30	28	8½	14 30
8	4½	4 25	14	4½	5 65	18	10½	10 37	24	4½	9 50	28	10½	15 80
8	5½	4 35	14	5½	6 20	18	12½	10 90	24	6½	10 30	28	12½	18 40
8	6½	4 50	14	6½	6 90	20	4½	7 80	24	8½	11 90	28	14½	21 50
10	3½	4 68	14	8½	7 50	20	6½	9 85	24	10½	13 45	30	6½	14 50
10	4½	4 84	14	10½	8 35	20	8½	11 10	24	12½	15 00	30	8½	17 20
10	5½	5 00	16	4½	6 70	20	10½	11 92	24	14½	17 80	30	10½	19 30
10	6½	5 50	16	5½	7 00	20	12½	12 75	26	6½	10 90	30	12½	21 40
10	8½	6 00	16	6½	7 35	22	4½	8 30	26	8½	12 70	30	14½	24 60
12	4½	5 10	16	8½	8 00	22	6½	9 70	26	10½	15 00			

Surface Planing Machines.

These machines are designed for producing planed surfaces, and for reducing material to any desired dimensions. They are the primary machines in wood finishing, and are indispensable. The styles and sizes of these are numerous, as the work they are intended to do is of great variety. The methods of feeding the timber and the methods of using the cutters vary with the character of the work to be done.

The Daniels Planer has a horizontal arm with a cutter fixed in each end of it, the arm revolving over the timber as it is carried on a table driven by appropriate gearing.

The Dimension Planer has a table upon which the timber is placed, but the cutting is performed by a rotating cylinder carrying two or more knives. This class of planers is designed for heavy timbers, or combined work, where heavy work is to be done occasionally, they being also adapted for lighter work.

These machines are designed for trimming and squaring up lumber, or timber where it is desirable to have it perfectly out of wind. In all the lighter and cheaper machines the feeding is done by rollers, and in the heavier machines, after the Farrar design, the feeding is done by an endless revolving apron, which, presenting a large surface to the lumber, makes this one of the strongest powers for feeding in use on this class of planing machines.

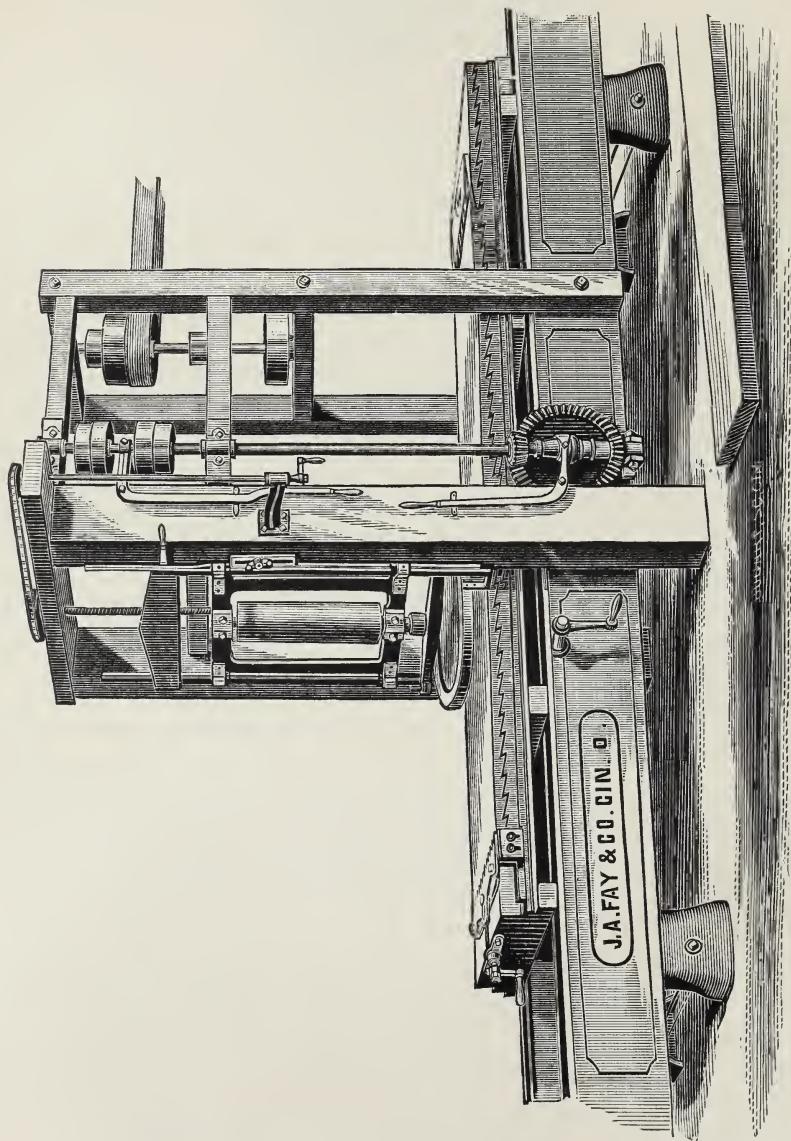
The surface planers, hereafter more particularly described, have been designed to perform each its special class of work, in the most perfect manner. In the care taken in their erection, and the improvements incorporated into them for the production of the best work with the least trouble to the operator, it has been our study to produce machines which will be in all particulars what the requirements of wood-manufacturers may demand.

The capacity of these machines is from the thinnest boards to eight inches thick, and from twenty to thirty inches wide on one or both sides; the largest surfacers being strong enough in their construction to endure the strains incident to planing the heaviest lumber used.

Considering the probable work to be executed, a selection can be made from these machines to give entire satisfaction to all users of them, either for thin or short stuff, hard or soft, green or dry; and for the heavier class of manufacturers, who use the strongest machines, they will perform their work without failure, even upon snowy or icy material, having been thoroughly tested and not found deficient in any particular.

Different styles and sizes will be found illustrated on the following pages, and appended to each specific description, with details of sizes and capacity for work, to which we invite the careful examination of those desiring to purchase, as the wants of almost every kind of wood producer will be found to have been fully anticipated.

Special surfacers are made to order from the heavier planers and matchers, by leaving off the matching attachments and parts for that work. These machines are of special utility where there is first class work to be done in great quantities, their great weight and strength enabling them to endure the continuous strain incident to heavy work.



Improved Daniels or Traverse Planing Machine.

(WITH WOOD FRAMING.)

Improved Daniels or Traverse Planing Machine.

(WITH WOOD FRAMING.)

The Daniels Planer has the peculiarity of cutting the surface at right angles to the grain of the wood; and for heavy timbers which are to be trued and squared there is no machine superior in its operation, the manner of cutting being such that the wood is not strained or displaced, and a perfectly true and straight face is produced by one cut. The material to be surfaced is laid upon a table, and held in place by dogs or clamps at each end, and carried under the cutter arm by the action of the table moving in either direction.

The feed motion is convenient and under the control of the operator, who can change it from fast to slow, and reverse the movement of the table instantly, the same levers being used for starting, reversing, or stopping the table. The cutting is done while the table is traveling in either direction; and by means of the crank attached to the feed pinion the table can be moved in either direction by hand.

The cutters are placed in an arm, which revolves in a horizontal plane, the cutters being easily removed for sharpening or adjustment.

A dead weight is furnished when desired, for the purpose of preventing the lighter timber from being lifted by the action of the cutters. Rolls are sometimes used where thin boards are to be planed; they press the lumber closely to the table, preventing any irregularities from warps or twists. They are easily put on or taken off, and are essential on some classes of work.

This machine is recommended for use in railway, bridge, wagon, or furniture works, where timbers are to be dressed, or lumber is to be trued up and taken out of wind.

The wooden framing of this machine is glued up, and made from the best material to be procured for the purpose. The table runs upon planed cast-iron ways, which give it perfect guidance, and insures straight work.

The pinion that drives the table runs in the top of the rack; the force being downward keeps the table in its position, with no tendency to lift into the cutters. The rack is under the table, and is perforated, which prevents the circulation of shavings in it.

The dog or clamp is arranged at the head of the table, so that varying lengths of lumber can be placed on the table; and the tightening screw is worked by a hand crank.

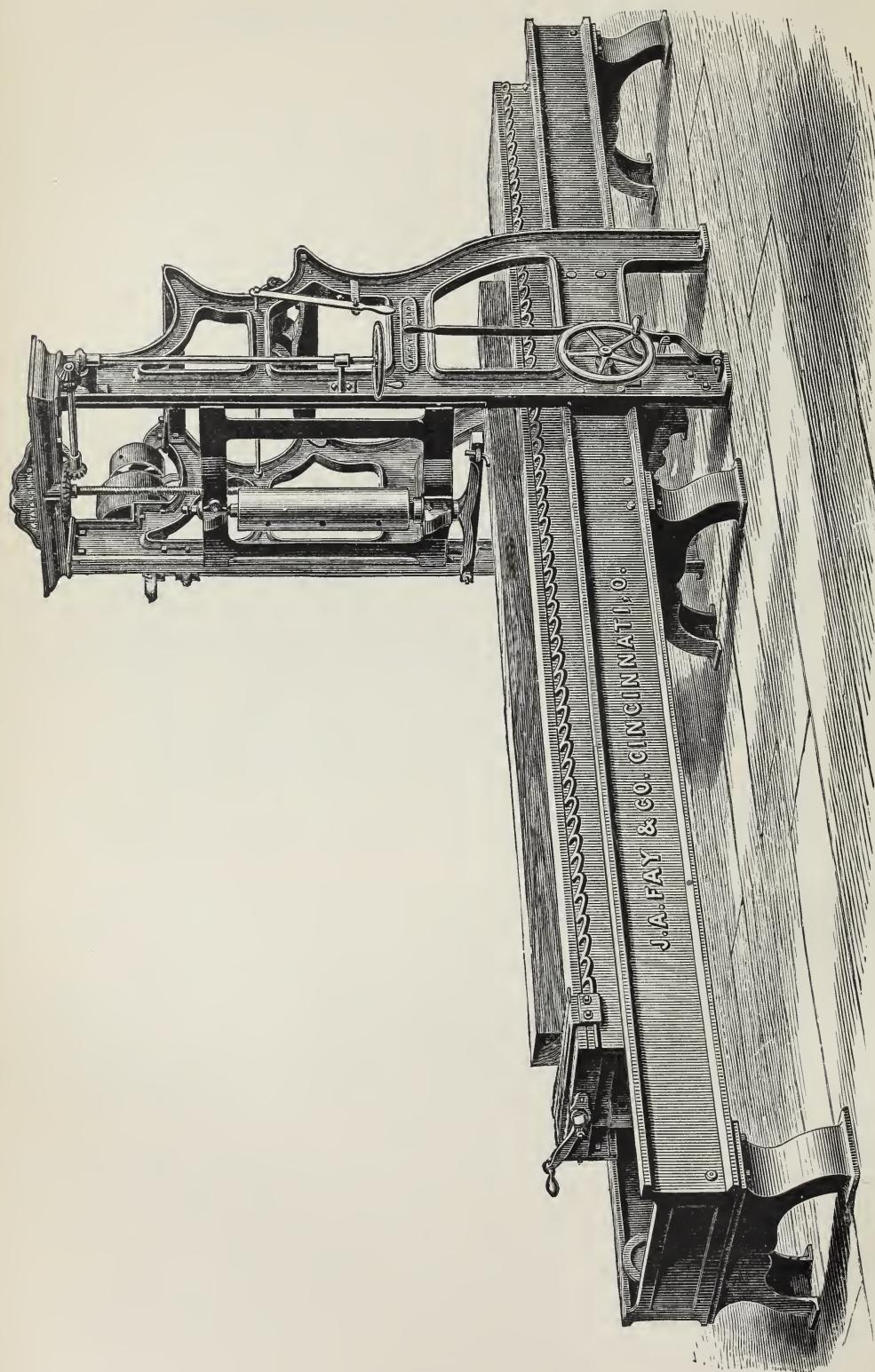
The tail clamp is adjustable to the lengths of timber, and is held in position by hooks fastening into racks on each side of the whole length of the table, and require no other fastening. There are also side clamps to the table.

The main spindle is of steel, of large diameter, and with the cutter arm and bearing frame is raised and lowered by means of a crank connected with the raising screw. The cutter arm is made of malleable or wrought iron, of such form as to make the least noise while revolving, and will cut the full-rated width under the dead weight.

All the working parts are strong and well fitted, and embody our latest improvements, every precaution being taken to make this one of the most perfect machines for truing up, planing and surfacing out of wind.

The dead weight and rolls are furnished at a small additional cost when wanted. The machines are constructed of any length and width desired.

The tight and loose pulleys on counter-shaft are twelve inches in diameter and five-inch face, and should make 500 revolutions per minute.



Improved Daniels or Traverse Planing Machine.

(WITH IRON FRAMING.)

Improved Daniels or Traverse Planing Machine.

(WITH IRON FRAMING).

The Machine illustrated and described on the preceding pages is the same in operation and appearance of the work produced as this, but the details of construction are materially different, although they each embody the same principles.

This machine is constructed entirely of iron and steel, excepting the face of the table, which is of yellow pine. The sides of the machine are cast in sections, according to the length.

The ways upon which the table slides are cast with the sides, and planed to fit the slides of the table, which are continuous, and form a perfect bearing at all points.

The supports for the cutter head and spindle are constructed in a very rigid manner, the arrangement of the levers for starting, reversing, or stopping the motion of the table with the hand wheel for raising and lowering the cutters, all are within easy reach of the operator, and the table can be moved by means of a hand wheel when the machine is not in operation.

This machine, being especially strong, is adapted to the purposes of railway, bridge and car builders, mill wrights, carriage and cabinet manufacturers, where lumber or timber is to be taken out of wind, or reduced to square dimensions.

There are several important improvements in this machine over any hitherto offered to the public, viz :

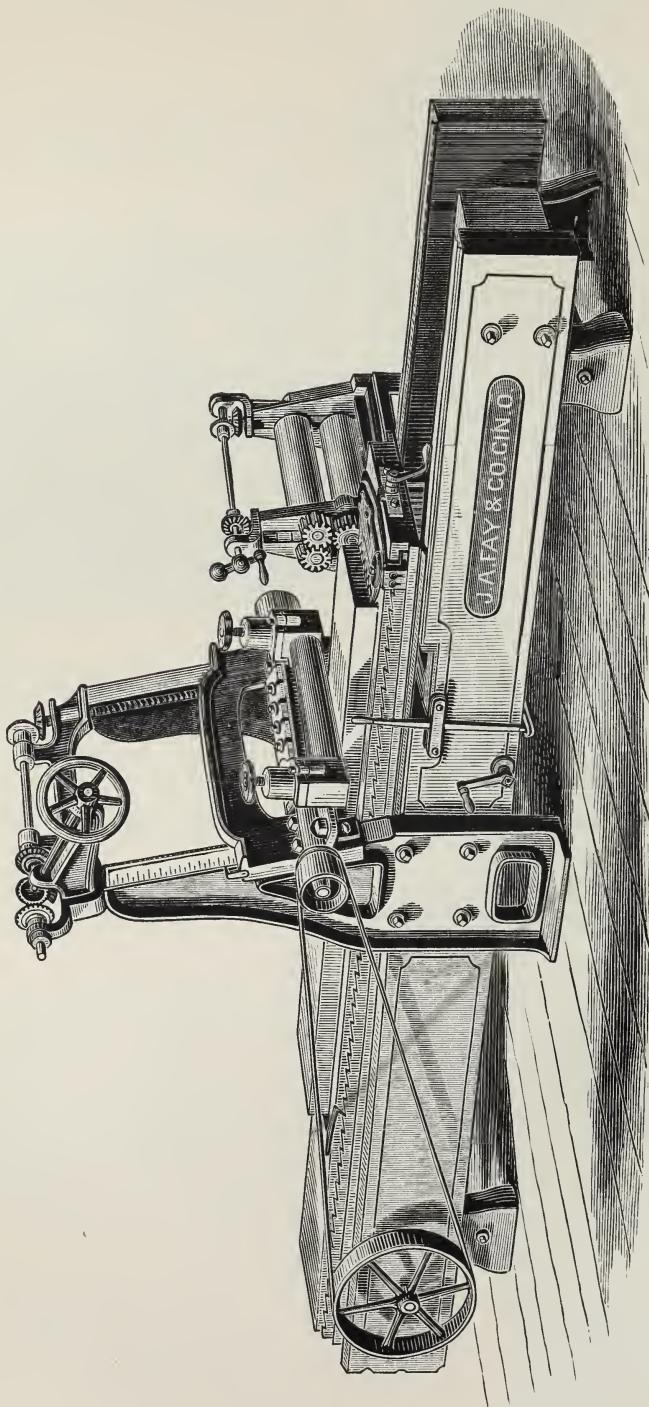
The improved feed works with three changes of feed, admitting of planing while the table moves in either direction.

The rack being under the table, and its pinion vertical, there is no danger of lodgement of shavings, nor tendency to raise the table by the force required to move it.

The main driving belt is not a quarter-twist. The counter-shaft is attached over the machine to the building, and parallel to the main shaft, giving a straight belt, the driving belt for the cutter acting at a right angle to the counter-shaft; by this means the old vertical counter-shafts are entirely avoided, with all the annoyance of quarter-twist belt, and the tendency of the main belt to draw the machine out of line.

The clamp for holding the timber is perfect in its working, and is furnished with all machines. All the improvements are added, and every precaution is taken to make this machine as perfect as possible for the purposes for which it is designed.

It is supplied with our patent tight and loose pulleys which are twelve inches in diameter, five-inch face, and should make 500 revolutions per minute.



Combination Dimension Planing Machine.

(WITH FEED ROLL ATTACHMENT.

Combination Dimension Planing Machine.

(WITH FEED ROLL ATTACHMENT.)

This combination of the traveling bed planer with the feeding rollers of the fixed bed machines, will be found to be one of great utility. The time consumed from changing from one method of planing to the other is very short, and the efficiency of its action is perfect.

The machine is adapted to the use of car and agricultural implement builders, cabinet and carriage, organ and piano-forte manufacturers, etc.

The surface produced by this machine is similar to that of the ordinary surface planer, having a horizontal rotating cylinder, and is perfect enough to be used for glue jointing.

The material to be planed is placed upon a movable platen and passed underneath the cylinder by a rack and pinion feeding arrangement.

The cylinder is supported in its frame upon two standards having planed surfaces, upon which the cylinder frame is moved vertically, and at an angle, to retain the belts at the same tension. There are two screws for raising the cylinder frame, which are operated simultaneously by means of a hand-wheel.

There is a pressure roller at the front and back of the cylinder, which holds the lumber solidly to the platen, or they can be lifted up so that there will be no pressure, which is the condition when planing dimension stuff or lumber out of wind.

The machine when fitted with the feed roller attachment for surface dressing, combines the essential peculiarities of both the Daniels and the Woodworth surfacing machines, viz. of surface dressing as fast as the Woodworth, and planing out of wind three times as fast as the Daniels Planer.

The machine is constructed to suit any length of stuff which it is desired to work, and the cylinder has a vertical adjustment on planed standards, sufficient to allow stuff up to twenty-four inches thick to be dressed out of wind.

The platen is furnished with the necessary dogging apparatus for securely holding the stuff, so constructed that with one motion any length of stuff is firmly secured to the platen.

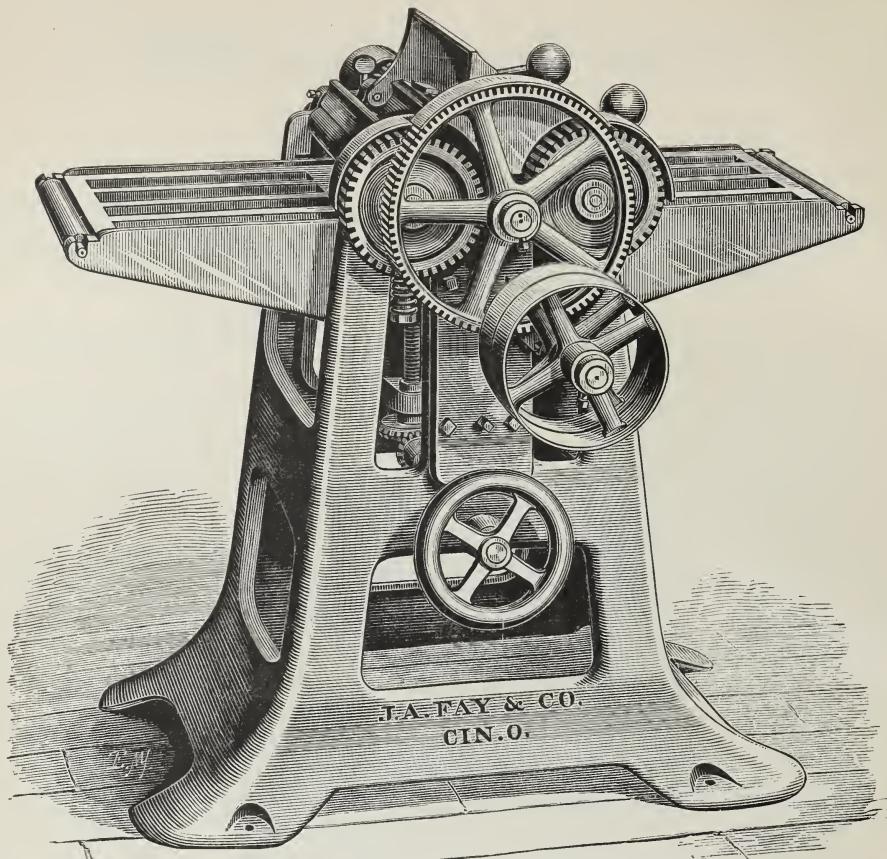
The feed rolls, when not in use, are quickly moved back out of the way on planed slides. The rolls are connected by expansion gearing, and take in lumber up to five inches in thickness, and when used for surface planing, the table is placed with its end under the cylinder and pressure rollers, and has a heavy plate for the lumber to pass over as it is being planed.

The feed works for the platen have three speeds for forward motion, and a quick return movement so arranged that the platen is relieved of all shocks from sudden changes of direction. The reversing lever for the return movement is in the most convenient position for the operator, and is retained in its place by a friction clamp.

The cylinder is lipped with steel, carries three knives, and runs in long patent self-oiling bearings, and the parts most liable to wear are constructed of iron and steel. The feed works are protected from dust, and it is made throughout in the most durable and substantial manner.

Two classes of this machine are made for heavy and light work, and are offered to the public in the confident belief that they will be found unequalled for the purposes intended.

The patent tight and loose pulleys are twelve inches in diameter and six-inch face, and should make 900 revolutions per minute.



NO. 2

Centennial Surface Planing Machine.

This machine is made to surface 16, 20, and 24 inches wide and is intended for light work, viz: panel stuff, cigar box lumber, and the general requirements of sash and door, carriage, box shops, etc.

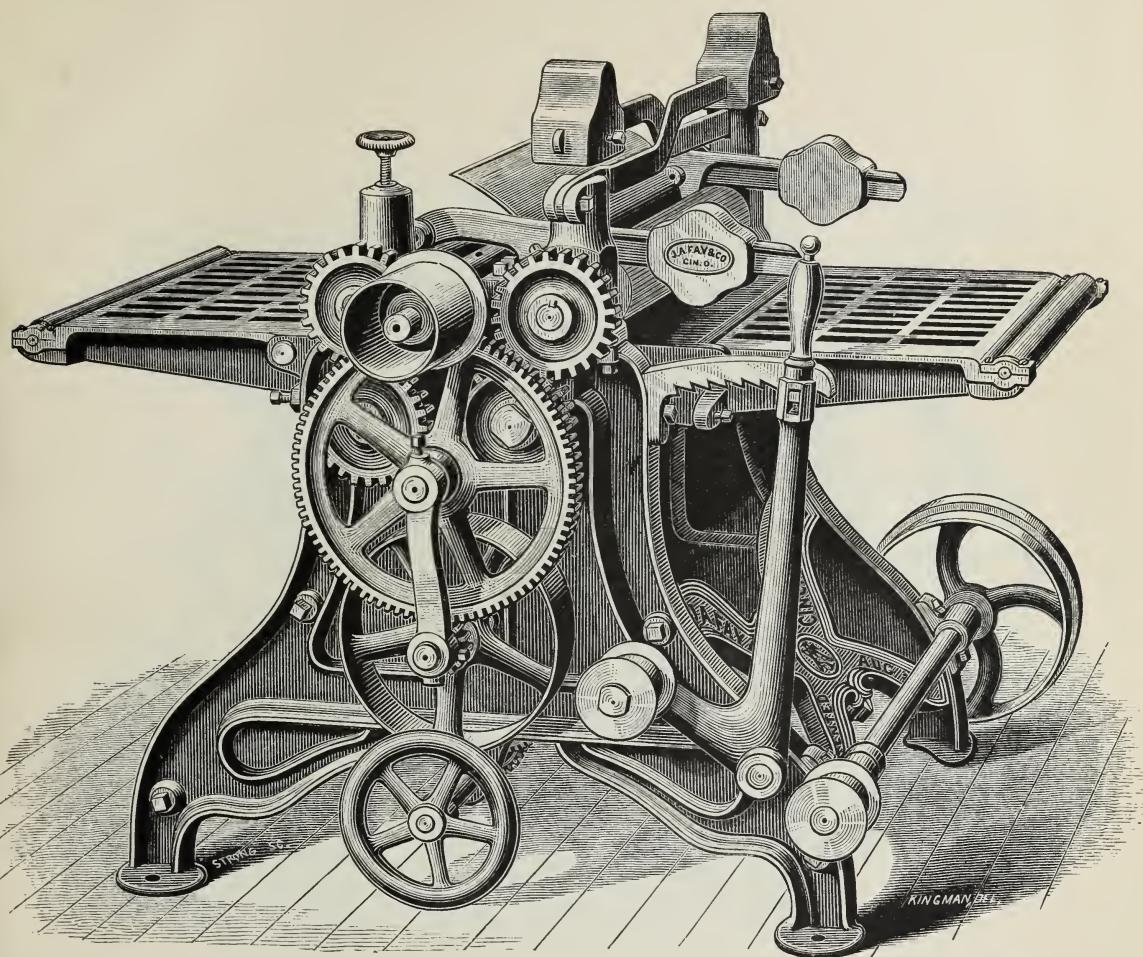
In designing the machine, we have endeavored to meet the wants of all the above-named classes, and produce a machine which will, with very little power, surface in a superior manner all kinds of hard and soft wood lumber.

The frame being cast in one solid piece, secures great strength and solidity over the old way of bolting together. The cylinder is made of wrought iron, with steel lips; the journals are long, of large diameter, and run in patent self-oiling bearings, lined with the very best lining material that can be procured.

There are pressure bars on each side for planing thin or short stuff. The cylinder boxes being cast to the side of the machine, makes them exceedingly rigid and strong and not liable to vibration or disarrangement. It can be belted either from a countershaft placed on the floor or overhead, as may be most convenient.

The arrangement for changing the machine from different thicknesses is very simple. The turning of a single hand-wheel adjusts the cutter-head and feed rolls together, preserving the same relative positions with the bed-plate, which is not always the case where the rolls and cylinder have independent adjustments. An index gauge shows the thickness to be planed.

The feeding rolls are large and heavily geared; the table or platen is long, provided with friction rolls, and every part is built in the most thorough and substantial manner, all joints being planed, holes reamed, and bolts turned. The countershaft, when ordered, will have tight and loose pulleys ten inches in diameter, and four-inch face, and should make 900 revolutions per minute.



NO. 3
Large Surface Planing Machine.

(SINGLE OR DOUBLE BELTED.)

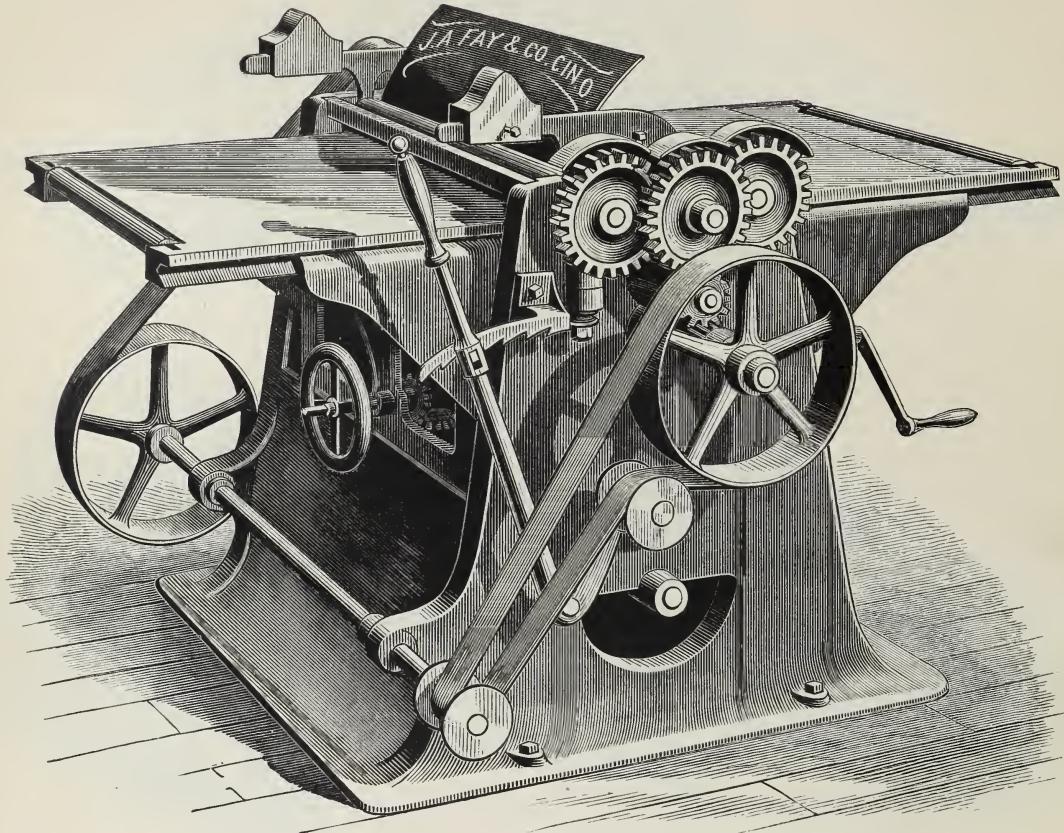
This machine is made to surface from one-eighth to five or six inches thick, and from twenty-four to twenty-eight inches wide, as may be ordered, and is intended especially for cabinet shops, sash, door and box makers, and for planing hard wood, either thin or short, and produces perfectly smooth surfaces.

This machine is capable of doing its work in the most thorough manner, being built entirely of iron and steel, heavy and substantial in all its parts, the proportions being such as to insure the greatest durability and strength.

The rolls for feeding are large and strongly geared, with two changes of feed, easily regulated and under control of the operator, and derive their pressure from weighted levers and springs, folded transversely and out of the way of the operator, and always reliable. The ends of the table are adjustable and can be raised vertically, reducing the machine much in size when not in use.

The table is always retained parallel with the cylinder at any point it may be placed, and quickly adjusted either while operating or not by the hand wheel which moves the raising screws. The cylinder has three cutters with steel lips, and has a flexible pressure bar to prevent any tearing out in cross-grained lumber. It is made to belt on one or both sides, as may be ordered, usually the former. The bearings are long, self-oiling, lined with very best metal, and perfectly fitted by scraping.

The cylinder pulley is five inches in diameter and six-inch face, and should make 3,600 revolutions per minute.



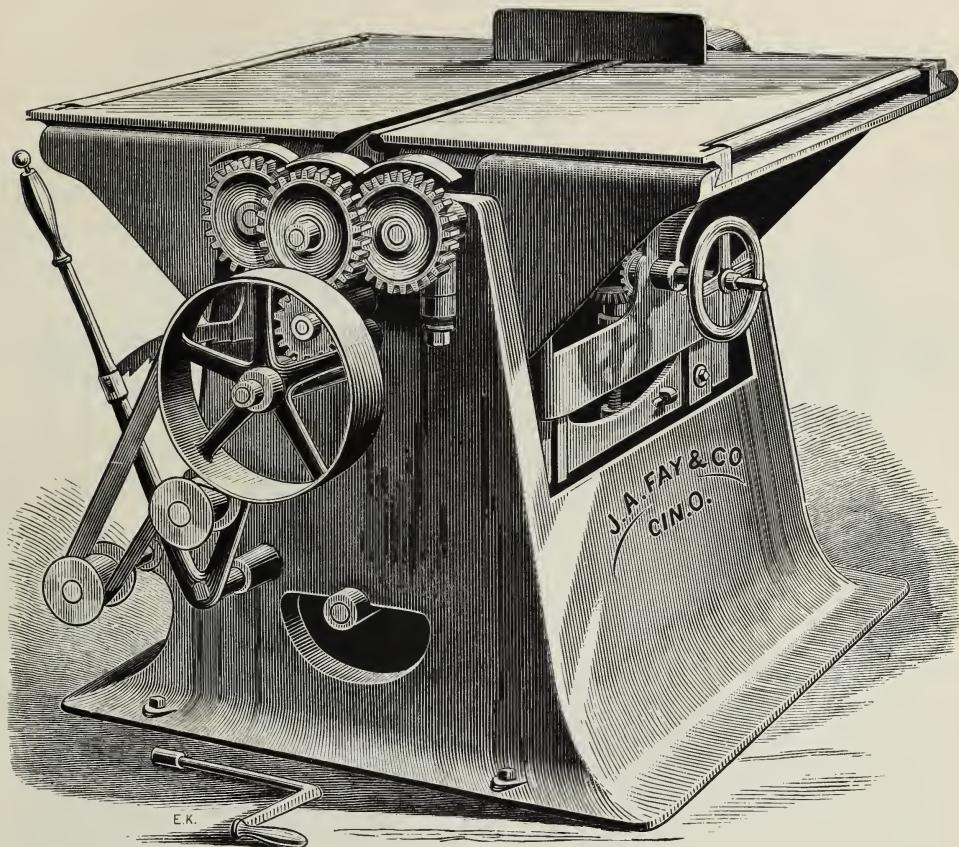
Patent Hand and Power Feed Surface Planer.

This machine is a combination of the power surfacing machine and the hand planer, and designed to save the expense of two separate machines in furniture and cabinet and coffin manufactories, etc., wherever the hand planer and jointer has been found of service and value. Superior capacity, economy of shop room, facility of adjustment are among its chief characteristics.

When arranged for planing under the cylinder by feed rollers, as shown above, it will surface long and short pieces up to 24 inches wide, and from $\frac{1}{8}$ inch to 6 inches thick. The feed rolls are of large diameter and strongly geared, ensuring a positive feed.

The cylinder has three knives, arranged at an angle, to give a shearing cut, avoiding, in connection with the flexible pressure bar before the cut, any tendency to tear in cross-grained lumber, and produces a very smooth surface. The bed has a vertical adjustment to suit different thicknesses of lumber. The end tables are planed perfectly true, and have both lateral and vertical adjustment. The feed is convenient to the operator, and governed by a hand lever and belt tightener.

When arranged for planing over the cylinder by hand, as shown on the next page, the bonnet and pressure-bar are removed, and the end tables elevated to the proper height by means of a hand wheel, requiring only about three minutes time to make the changes. These end tables have a lateral adjustment in planed grooves to regulate the opening over the cylinder. The cylinder pulley is five inches in diameter and five-inch face, and should make 4,000 revolutions per minute.



Patent Hand and Power Feed Surface Planer.

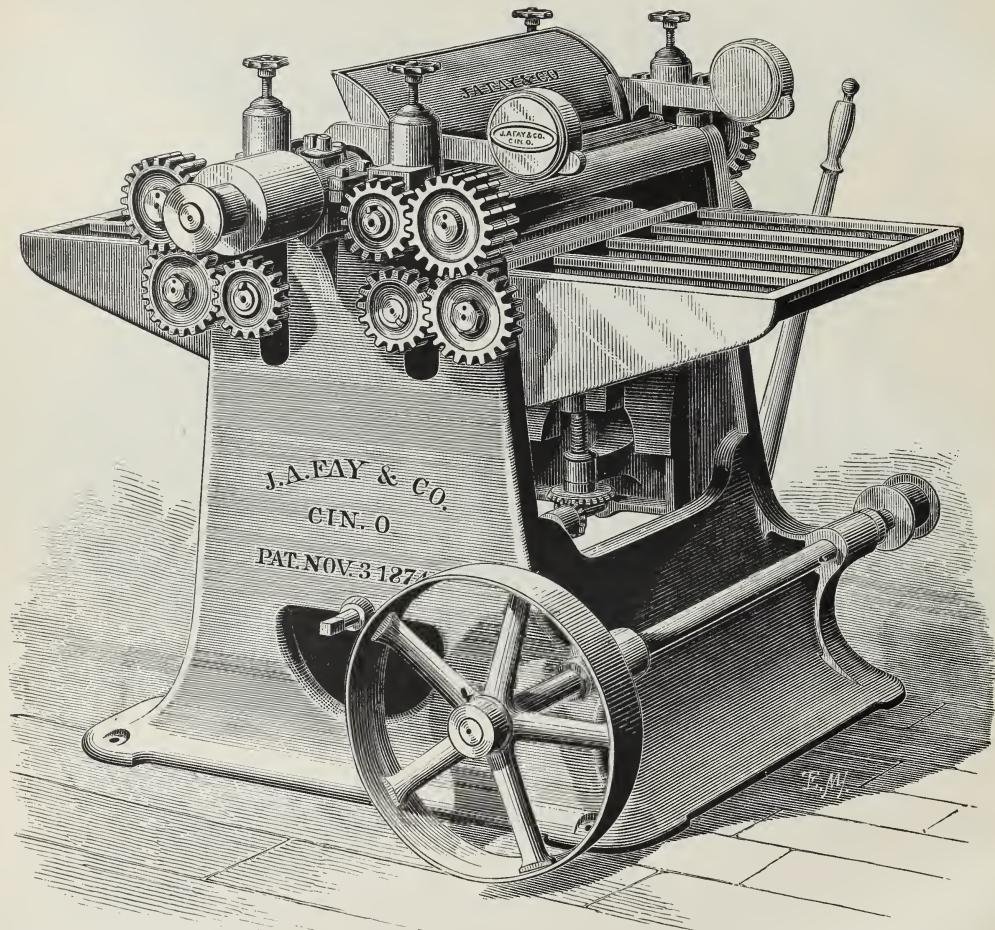
THE above machine is the same as that illustrated on the preceding page, converted into a twenty-four-inch planer for planing out of wind, surfacing straight or tapering work, jointing, chamfering, beveling, making glue joints, squaring up bed posts, table legs, newels, etc., and performing all the functions of the ordinary hand planer.

The cylinder carries three knives arranged at an angle to give a shearing cut, revolves in self-oiling boxes, and is provided with steel lips, whereby very smooth work is produced.

A fence is furnished with each machine for use in hand planing, which can be adjusted across the table or to an angle of forty-five degrees to the face of the table.

The machine is constructed on a strong and substantial column, is fitted in every part in the most accurate manner, receives a thorough practical test before leaving the shop, effects a great saving of labor, and for the purposes for which it is intended we guarantee it to give entire satisfaction.

The cylinder pulley is five inches in diameter, five-inch face, and should make 4,000 revolutions per minute.



NO. 4

Improved Double Roll Surface Planing Machine.

(WITH UPPER AND LOWER DRIVEN FEED ROLLS, CHIP-BREAKERS, ETC.)

NO. 4

Improved Double Roll Surface Planing Machine.

(WITH UPPER AND LOWER DRIVEN FEED ROLLS, CHIP BREAKER, ETC.)

The surface planing machine illustrated on the opposite page has been recently designed by us, and intended for general classes of work, both light and heavy. It contains many improvements which are essential in the operation of surfacing wood.

The capacity of the machine is to four inches in thickness and to twenty-four inches in width.

It will plane perfectly hard or soft wood, and is adapted to the wants of carriage and agricultural implement makers, wagon and car works, and general surfacing in other establishments.

The column or support of the machine is constructed with sides and ends of continuous plates of cast iron. The bearings for the cylinder journals and pockets for the roller boxes being cast with the sides, the gibbs for the direction of the table in its vertical motion are also cast in the sides.

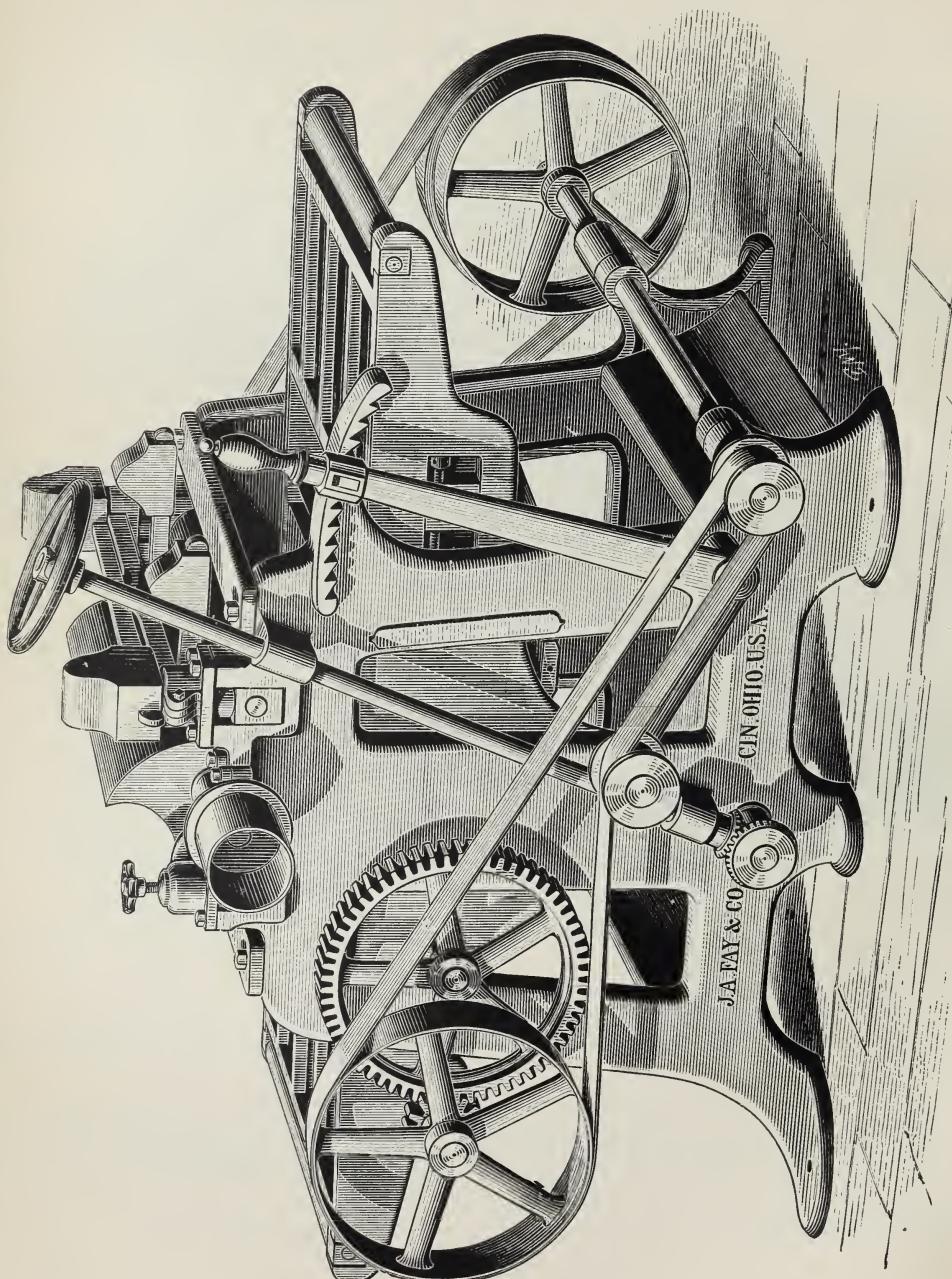
The table has guides, which correspond to the gibbs in the sides, they being planed to fit and to retain the table in its horizontal position. The table is raised and lowered by a hand wheel operated by screw and bevel gears.

The rollers, four in number, in two pairs, one of each pair being in the table, are all driven by a system of gearing arranged to operate expansively as the table is lowered from the cylinder. The rollers are large, the upper pair are heavily weighted and regulated by adjusting screws.

The cylinder has two knives, long steel journals, and there is a flexible weighted pressure bar before the cut to prevent tearing out or loosening knots.

The feeding arrangement is controlled by a lever and tightener, which are convenient to the operator.

A counter-shaft and pulleys are furnished when wanted, having the patent tight and loose pulleys which are ten inches in diameter and five-inch face, and should make 1,000 revolutions per minute.



N.O. 5

Medium Size Endless Bed Surface Planer.

(WITH STEEL LIP CYLINDER AND WEIGHTED PRESSURE ROLL.)

NO. 5

Medium Size Endless Bed Surface Planer.

(WITH STEEL LIP CYLINDER AND WEIGHTED PRESSURE ROLL.)

This machine is from new designs, and combines in its construction the well-known features of the revolving bed planers, with improvements developed by experience in their use. It will plane in a superior manner hard, soft, green, dry, wet, or icy lumber of any kind.

The capacity of this machine is to twenty-four inches in width and to eight inches in thickness, and it is built in such proportions as to insure its durability, it being strong, heavy, and compact in the arrangement of its parts.

There is an endless apron or bed of slats connected together in the most approved manner, and driven by heavy gearing, forming a very powerful method of feeding lumber in planing.

The slats are cast from the best cold blast iron, and arranged to avoid any variation in the wearing surface, and the runners over which they slide are of the same material, ground and finished in the best manner on their wearing surfaces.

The cylinder has three knives, with steel lip chip breakers, heavy steel journals, self-oiling boxes, with large oil cavities in the bearing, and a bonnet which can be easily removed for adjustment of the knives.

The pressure rollers are of wrought iron, movable at each end, and weighted with our patent folding weighted levers, which are hung transversely across the machine, and so arranged as to readily adapt themselves to uneven thicknesses of lumber being worked.

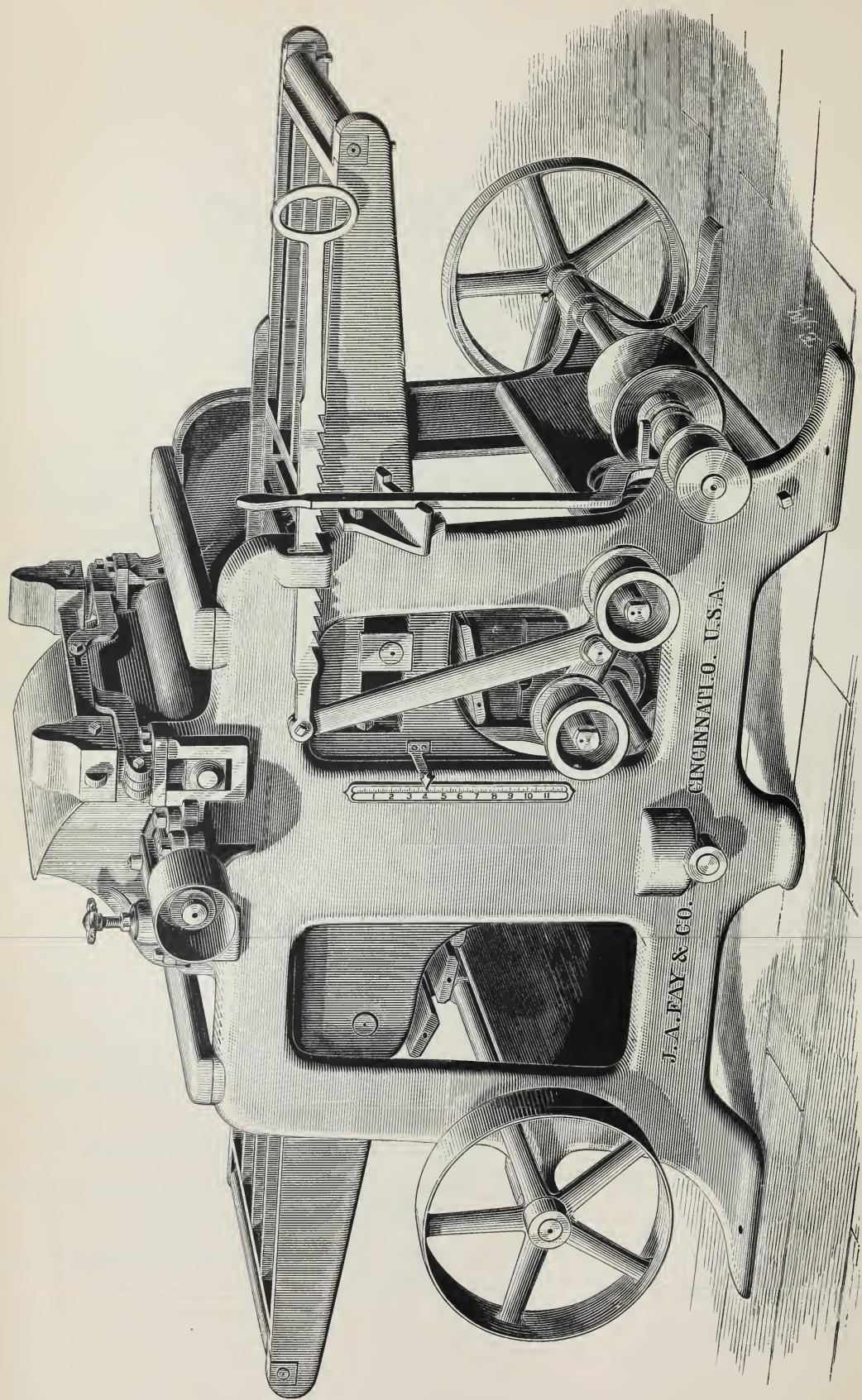
The cylinder has a chip-breaking pressure bar before the cut, arranged to make but little friction on the lumber, and to prevent any tearing out during the planing.

The bed is raised and lowered by screws connected with gearing and operated by a hand wheel convenient to the operator. The feed is governed by an idler lever, with a spring catch to hold it in position.

There are two speeds of feed, which can be easily changed as may be desired.

This machine is designed for all kinds of surface planing of a medium character, and operates in a superior manner on hard, soft, knotty, and cross-grained lumber.

It has the patent tight and loose pulleys, which are twelve inches in diameter and six-inch face, and should make 875 revolutions per minute.



Large Size Endless Bed Surface Planer.

(WITH POWER ELEVATING BED.)

Large Size Endless Bed Surface Planer.

The machine illustrated on the opposite page is very heavy, strong, and powerful, intended for surfacing lumber of any kind required, for planing mills, bridge, boat, and ship builders, agricultural shops, etc., and wherever a heavy surfer is required.

It has a great range and capacity for work, from one-fourth to twelve inches in thickness, and to any width desired, either twenty-four, twenty-six, twenty-eight or thirty inches. It will plane car sills, decking, scantling, or any kind of hard or soft lumber, not only with the greatest ease, but with wonderful rapidity and in the very best manner.

The frame of the machine is very heavy and massive. The cylinder is stationary, making it convenient to have the countershaft placed on the floor, or overhead, as may be desired. It carries three cutters with steel lips, heavy steel journals running in patent self-oiling bearings, so arranged as to flood the journals constantly with oil, and has pulleys for two driving belts.

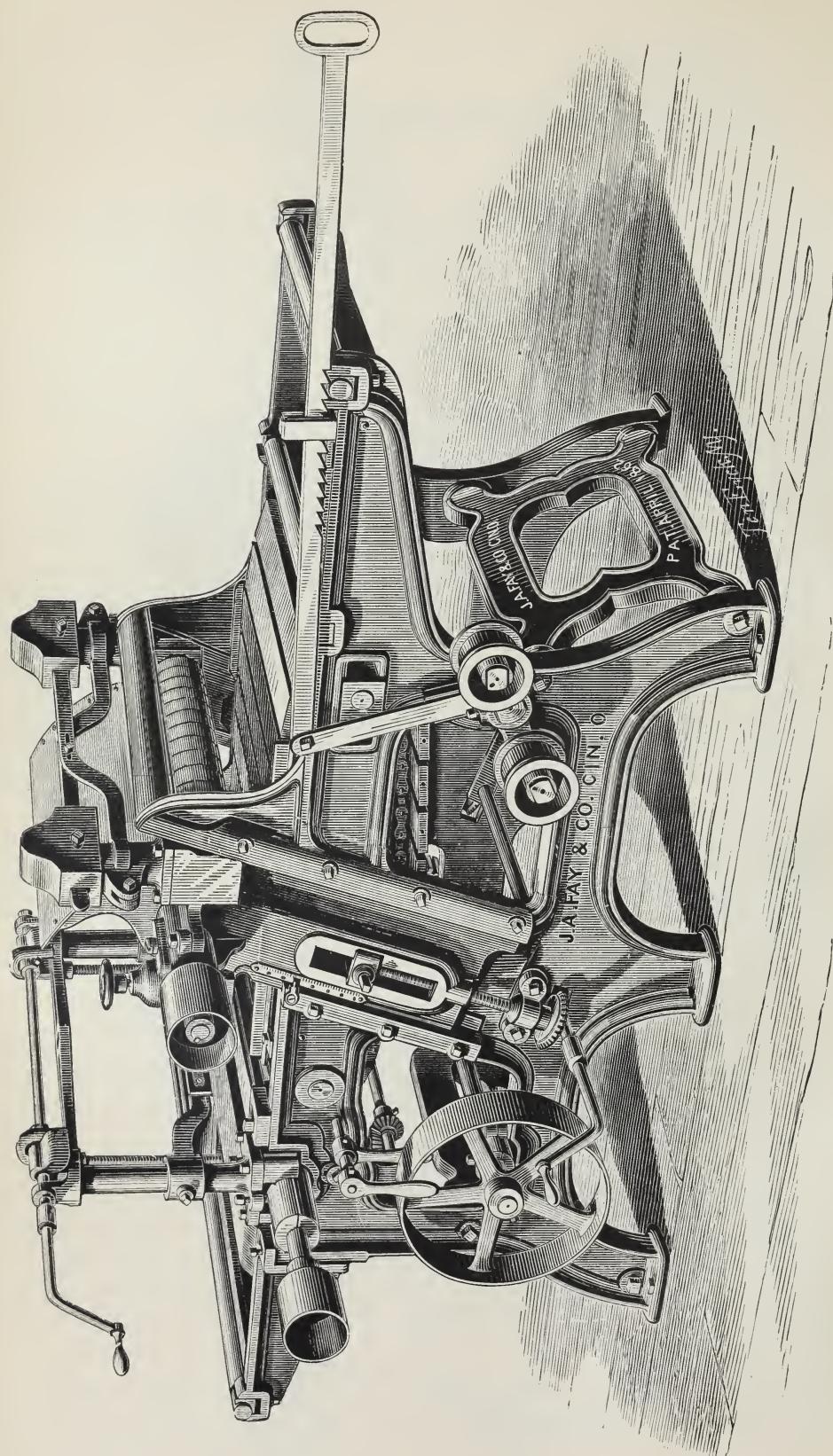
It is provided with a chip breaker for holding the fibre of the wood during the process of cutting, and has a pressure roll in front weighted with our patent folding levers, so arranged that either end will work independently of the other, which is indispensable on unevenly sawed lumber. This allows the rolls to adjust to the different thicknesses of lumber without causing any undue strain on any of its parts.

The bed plate sustaining the apron or carriage is made of the very best chilled iron, also the slats over which it runs. The method of constructing is such as to secure a surface as hard as tempered steel.

All the bearing points have perfectly ground faces. The apron slats are very heavy, the bearing points being upon the outer ends, the links attaching close to the bearing, and a heavy rib extending lengthwise the slat from one end to the other. This form of slat reduces the tendency to wear in the center, and the bed remains at one level, an improved feature in this class of machinery.

It has a power elevating arrangement for raising and lowering the bed, operated and controlled by the hand lever at the side of the machine. It works very rapidly, without noise, and is one of the most convenient attachments to be found for the purpose. It has a straight feed belt, our improved self-acting belt tightener for starting and stopping the feed, changes of feed, etc.

A countershaft and pulleys is furnished when desired at a small extra charge, and includes our patent tight and loose pulleys for relieving the strain upon the belt when not in use. They are fourteen inches in diameter and eight inch face, and should make 875 revolutions per minute.



LARGE SIZE

Double Cylinder Endless Bed Surface Planer.

(WITH PATENT FOLDING WEIGHTED LEVERS.)

LARGE SIZE

Double Cylinder Endless Bed Surface Planer.

(WITH PATENT FOLDING WEIGHTED LEVERS.)

The accompanying engraving represents the largest of a new series of double surfacing planers, of the heaviest class now built, and will surface from one-fourth to eight inches in thickness, and up to twenty-six, twenty-eight, thirty, or thirty-six inches in width.

Care has been taken to embrace every improvement which our long experience in the manufacture of this class of machinery has found to be necessary in order to produce the greatest quantity of work with the least amount of power and in the shortest space of time.

It is intended for large planing mills, bridge, railroad and car shops, and wherever a heavy and substantial machine of large capacity is desired, and is constructed on nearly the same general principle as the endless bed surface planers illustrated on the preceding pages.

The cylinders are belted on both sides, have three knives, steel lipped chip breakers and wearing edges, large steel journals with long and self-oiling bearings all perfectly balanced. The line of the bed being in a fixed position, the upper cylinder is made to adjust to the thickness of the lumber.

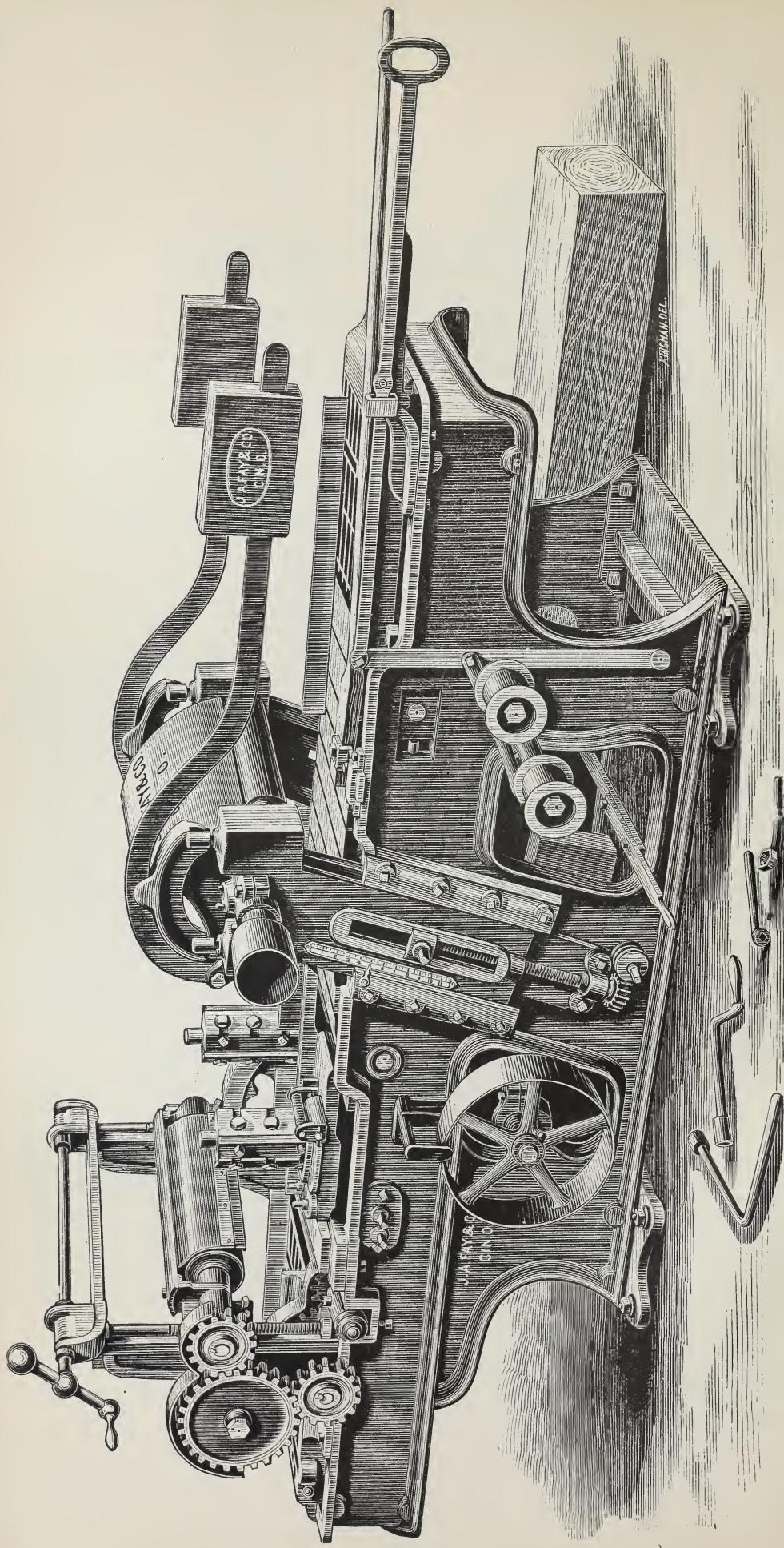
The slats of the bed are made from cold blast iron, with bearings on ways of the same material, with all surfaces ground and finished in the best manner. The upper cylinder is carried in stands, planed in and gibbed to the sides of the machine, and is raised and lowered by screws, connected by gearing worked by a hand wheel. The pressure rolls are raised and lowered with the cylinder, and supplied with our patent folding and weighted levers, allowing the rolls to operate independently or together, to accommodate the thickness of the lumber.

The under cylinder carries three cutters, has combined boxes, secured to a heavy yoke, which can be instantly raised or lowered to suit the work, by simply turning a crank, and is made easy of access by swinging the table in front entirely out of the way by the removal of one bolt, both upper and lower pressure bars having independent adjustment.

The entire machine is constructed of iron and steel, substantial in all its parts, and fitted together in the very best manner; all joints are planed, holes bored, and bolts turned.

The feed is not surpassed in power by any machine of its capacity, and for every kind of work, even wet, green, or icy lumber it is unequaled.

It is supplied with a countershaft, having our patent tight and loose pulleys upon it, which are twelve inches in diameter and eight-inch face, and should make 900 revolutions per minute.



Large Car Sill Dressing Machine.

(TO WORK THREE OR FOUR SIDES.)

Car Sill Dressing Machine.

The machine, illustrated on the opposite page, as its name indicates, has been specially designed for the heaviest descriptions of work, and is recommended for railway, car, and bridge builders. It will surface to twenty-four inches wide, or square up on three or four sides, sixteen inches wide by eight, ten, or twelve inches thick at one operation, as may be desired.

The bed of the machine is fixed, the cylinder and rolls being adjustable to the various thicknesses of lumber to be planed. This is a great advantage, as it gives the operator greater convenience and facilities in handling the heavy timber to be planed. The feeding arrangement is powerful, consisting of a revolving endless bed, made of slats cast from the best cold blast iron, the slides on which they travel being of the same material, with accurately-ground faces; auxiliary to this, a pair of large feeding rolls, expansively geared, are added, to draw the timber from the side cutters.

The cylinder has three knives, steel-lipped chip breakers, long and heavy cast-steel arbors running in self-oiling boxes, and pulleys for two belts, and is raised and lowered by power. It has a wrought-iron bonnet to direct the shavings, which are turned out of the way of the cutters. The upper pressure rolls are of wrought-iron, made very heavy and weighted by a yoked pressure lever; a very powerful combination indispensable to the work to be accomplished.

The side heads are made of steel, have three knives, either ten inches or twelve inches in length, as may be ordered; the spindles have a top bearing, are very heavy, of the best refined steel, running in our patent self-oiling bearings, having special oiling devices, which keep the steps and upper boxes constantly lubricated, and are adjusted by means of heavy square thread screws which retain them in their places when set.

The side heads are fitted with our patent chip breaker, which prevents the tearing of the lumber when working flooring, which can be done by substituting matcher heads for the side cutters. There is also a lever in the table to hold the stuff against the fence as it is being fed in.

The feeding mechanism is simple and controlled by a revolving arm and idlers worked by a lever within convenient reach of the operator.

The four-sided machine has an under cylinder added, which makes it a perfect machine for putting the finish on sills and other square work at one operation. Countershafts and floor hangers are furnished, completing the machine ready for use.

It has the patent tight and loose pulleys on the countershaft, which are fourteen inches in diameter and ten-inch face, and should make 825 revolutions.

Woodworth Planing and Matching Machines.

Among planing machines the Woodworth or horizontal rotating cylinder planer, with the combinations of pressure rolls or bars for surface planing, and vertical rotary heads for matching or tonguing and grooving, is notably the first in importance, for its present perfectness of construction, and the speed with which it finishes in excellent quality and extraordinary quantity the work it is designed to accomplish.

During the short period of about forty years since the inventor produced the first machine, they have been gradually improved from their original form, which embraced the essential principles necessary to a working machine, to the latest added detail, now considered indispensable to the perfect and convenient manipulation of the modern planer and matchers.

Having given special attention to the construction, and studied all the parts in detail, for their better improvement, for the convenience, strength, durability, and adaptability, as well as simplicity, we are prepared to offer to the public machines of such arrangement as to meet the demands of all users, and feel confident that the following enumeration of the properties and arrangements of them will be sufficient to convince all that machines perfectly constructed upon the specifications given must be all that can be desired.

The cylinders of these machines are constructed with two, three, or four knives, have steel journals and steel lips for chip breaking, forming, with the knife, a double iron, as in the common hand plane. The four-sided cylinder is made of wrought iron with steel journals, and having either two or four sides slotted for using a variety of knives upon it, and are adapted for beading, bevel siding, or moldings.

The journals of the cylinders are of steel, of diameters in proportion to the weight of the cylinder, the length of the bearings being from four and a half to five times the diameter of the journals.

The bearings are perfectly fitted by scraping the lining metal, which is of the best anti-friction compound, made expressly to our order; they are also provided with our patent self-oiling boxes, which keep the surface of the journals constantly lubricated, and are retained in line by being cast solid to a connecting back, which is accurately planed between two heavy standards and internally gibbed, so that the constant jar of the lateral motion of the cylinder does not tend to change their position.

The machines adapted to making drop siding and molding are arranged with a swinging pressure bar, which is adjustable to and from the cylinder. The cylinders are adjusted vertically by means of screws connected by gearing, and can be raised and lowered while in operation. The cylinder is readily removed for re-planing or replacing when worn out of line.

The matcher heads are of gun metal, with two or three wings, as the style of the machine dictates. All are furnished with our improved patent matcher clip, and provided with large oil holders to the vertical bearings, and the steps of the spindles are arranged for a continuous flow of oil while revolving.

The arrangement for changing from a *matcher* to a *surfacer* is complete in all its details. The matcher hangers are attached to a vertically adjustable frame, which, with the heads remaining on the spindles, can be lowered under the line of the cylinder bed in a moment, and when again raised are ready for use. Our patent drop matcher attachment is furnished with all the large machines, as will be seen in the specific description. The small machines are easily changed from a floorer to a surfacer by removing the heads or the spindles.

The feed rolls are of large diameter, and are provided with our patent weighting attachment and pivoted boxes, which secure an equal pressure on the lumber being worked, regardless of any inequalities in the thickness, and the position of the weights is not altered when adjusting the rolls to different thicknesses of stuff.

The rolls are connected by patent expansion gearing of superior construction, which allows the upper roll to adapt itself to the varying angles on irregularly sawed lumber; and the rolls can be adjusted to different thicknesses of stuff, with the feed always the same.

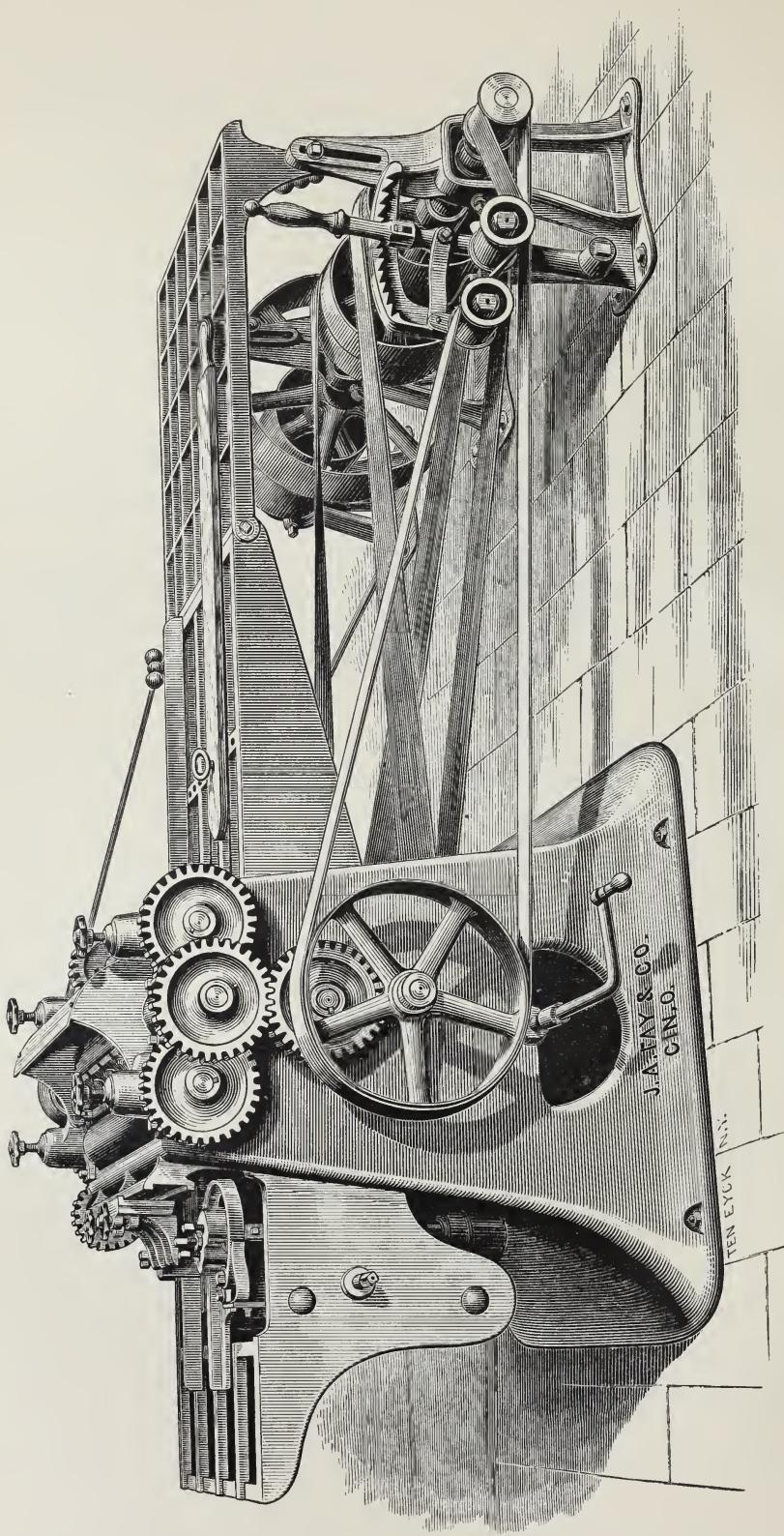
On the double surfacing machines the under cylinder is placed between two adjustable bars, which govern the thickness of the cut taken, and is otherwise arranged for convenience of access, as will be explained in the special description. Over the cylinder is a pressure bar, raised and lowered by means of screws turned by bevel gears connecting them.

The patent beading attachment is inserted into the pressure bar, over the under cylinder, so as to gauge the depth of the bead, from and by the surface of the board, thus securing an automatic adjustment of the beading shaft at all times. The bead being stuck after the surface is planed, makes a perfectly smooth molding; this is indispensable for working ceiling and partition stuff. This arrangement is covered by letters patent.

The improved board guide is necessary for holding up the lumber to the fence before it reaches the rolls, and requires no care after being adjusted. The belt tightener, which controls the feed works, is of great importance, as it regulates the speed, the feed being instantly started and stopped or graduated to the quantity of cut being taken.

The patent loose pulley supplied with each counter-shaft is of great advantage, being smaller in diameter than the fast pulley. When the belt is shifted from the fast to the loose pulley, the strain on the belt is at once relieved, and the friction on the pulley is much reduced; the belt consequently lasts longer, being freed from constant tension.

These machines are built upon heavy and substantial frames, thoroughly bolted together. All the revolving parts are balanced with care, and all surfaces are planed to fit. The best materials are used in their construction, and practical tests are made with every machine to insure a perfectly-finished machine in all particulars.



NO. 1 FOUR ROLL

Little Champion Patent Planing and Matching Machine.

NO. 1 FOUR ROLL

Little Champion Patent Planing and Matching Machine.

This machine has been recently designed and perfected with a special view to meet the demand for a machine that would combine small cost with the necessary qualifications of a good planer and matcher for custom work in small shops. It is brought before the public in the belief that it possesses all the requisites in a manner not hitherto equalled.

Its capacity is for surfacing twenty-four inches wide and under, and from one-fourth to five inches in thickness; also, for tonguing and grooving flooring, ceiling, etc., and for working the rustic or patent siding.

The frame of the machine is made with solid cast ends, with iron connections, and while it is compact and occupies but small floor space, is solid and heavy.

The cylinder has steel journals running in patent self-oiling boxes, so constructed as to constantly flood the journals with oil. No separate adjustment of the rolls and cylinder is needed to change for different thicknesses of stuff,—this change being made almost instantly by simply one movement of the hand wheel at the side.

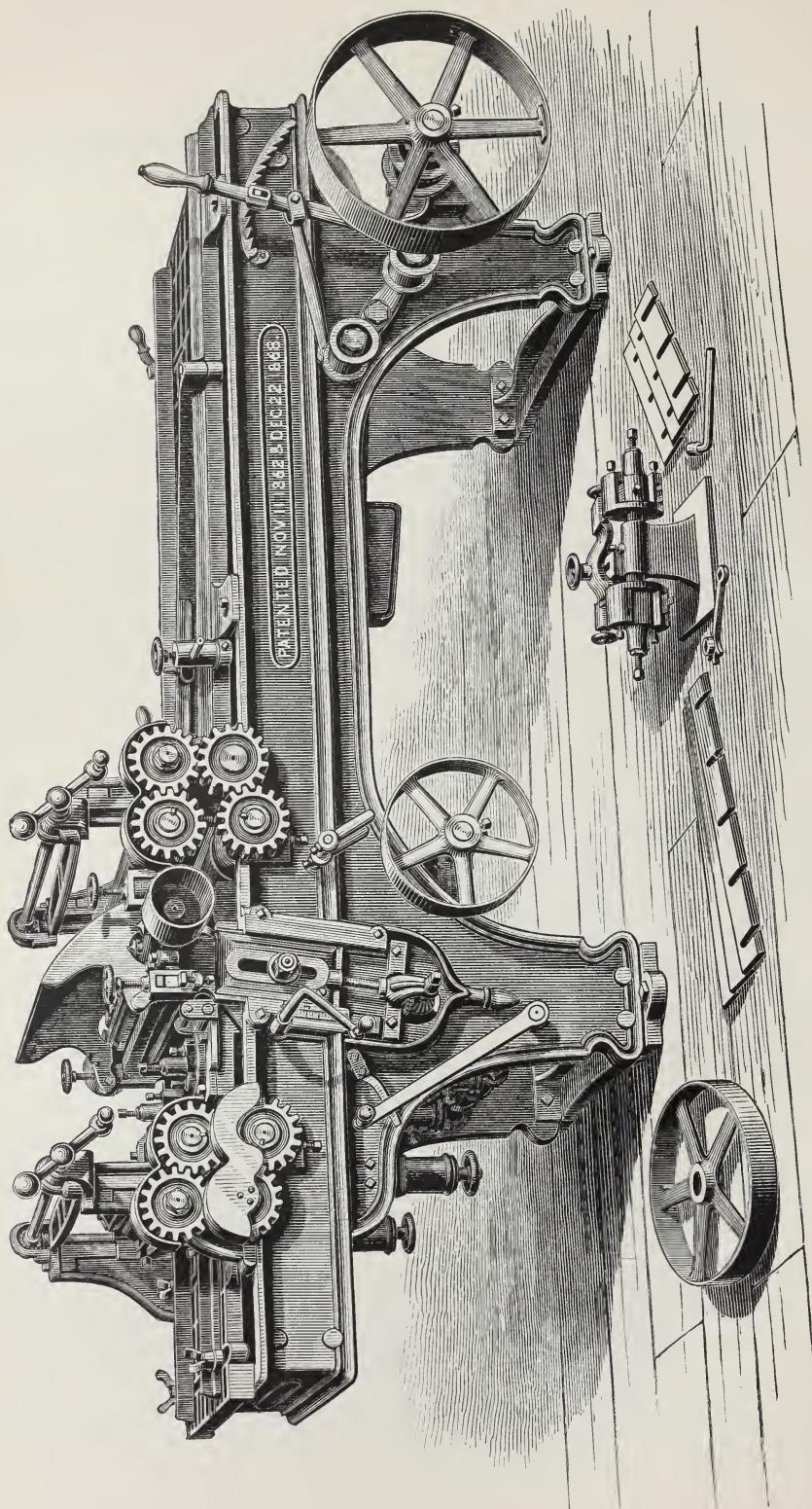
It has four driven feed rolls, which are connected by patent expansion gearing, and have our patent weighting attachment, which is arranged so as to produce a uniform pressure on the stuff being worked. The feed is strong and positive, and readily started or stopped by our improved belt tightener.

It is provided with steel matcher spindles, fitted with gun metal matcher heads, patent matcher clip for preventing tearing in cross-grained and knotty lumber, and can be changed in three minutes from flooring to wide surfacing, or *vice versa*, without removing the matcher spindles.

The counter-shaft is detached from the machine; is provided with patent tight and loose pulleys, and is placed on the floor, giving good length of belts. The pulleys are large and fitted for wide belts.

Each machine is provided with shaving bonnet, board guide, pressure bars, one set of long knives, and one set of patent solid milled matching cutters, is fitted up in the most thorough manner, and receives a thorough, practical test before leaving the shop.

The tight and loose pulleys are ten inches in diameter, six-inch face, and should make 900 revolutions per minute.



NO. 2 FOUR ROLL

Patent Planing and Matching Machine.

(VICTOR.)

NO. 2 FOUR ROLL

Patent Planing and Matching Machine.

(VICTOR.)

The machine herewith illustrated will surface up to twenty-four inches wide and four inches thick, and tongue, and groove, and match up to fourteen inches in width. It has recently been much improved in its essential working parts, and will be found specially adapted to the requirements of small planing mills, box makers, builders, etc., and wherever a really first-class planing and matching machine of moderate cost is desired.

It has four feeding rolls of large diameter, which will admit stuff four inches in thickness, is driven by improved patent expansion gearing, and fitted with our patent weighting attachment, which insures a uniform pressure on the lumber, without regard to the variations in thickness caused by uneven sawing.

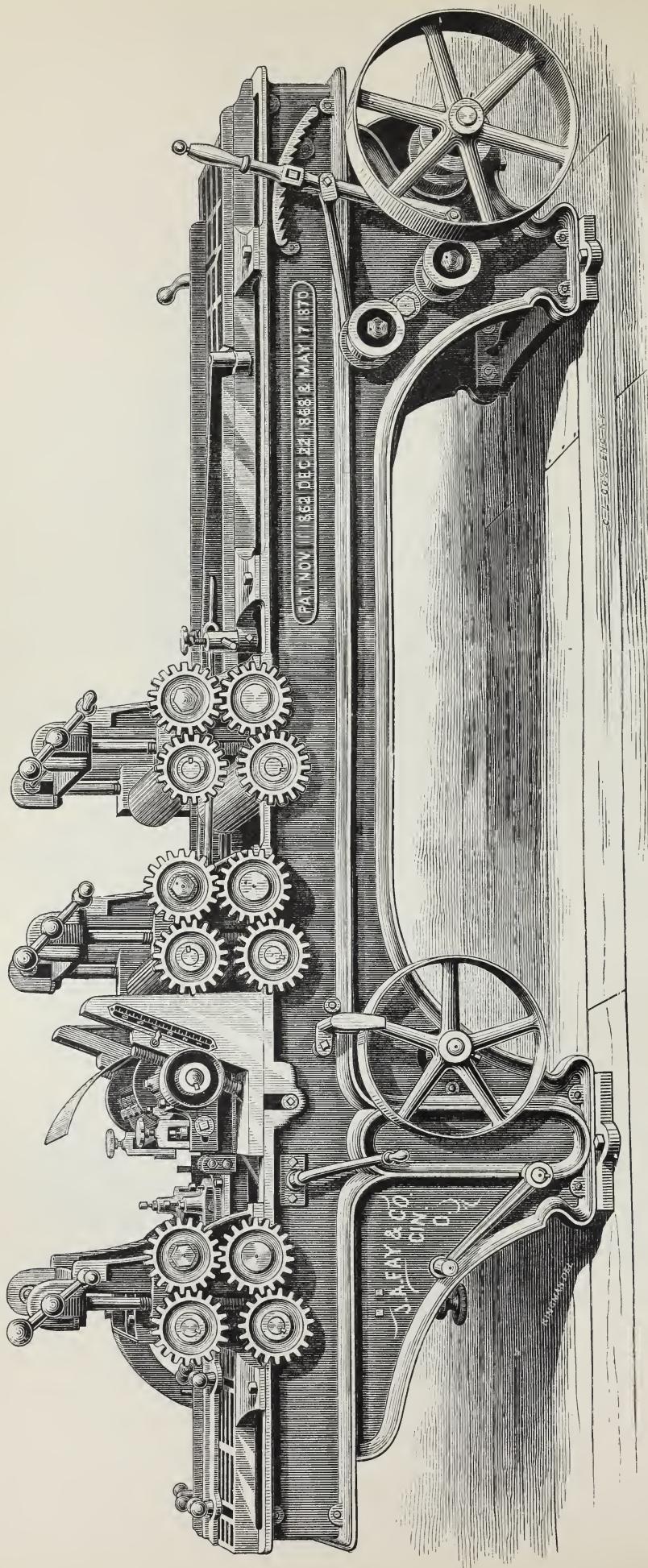
The cylinder carries three knives, runs in long, patent, self-oiling bearings, and is fitted with steel lips, which prevent wear and act as chip breakers in working cross-grained lumber. Splitting or tearing at the ends of cross-grained boards is prevented by the patent matcher clip which accompanies each machine.

The matcher spindles are made from refined steel, can be quickly lowered below the bed or platen, when it is desired to surface the full width of the machine, and quickly re-adjusted to their proper position for working flooring. The matcher heads are made of gun metal, and perfectly balanced.

The machine is provided with our improved belt tightener for stopping and starting the feed, changes of feed for hard or soft wood, improved board guide, iron gear covers, full sets of wrenches, patent solid matcher cutters, and the patent tight and loose pulleys. It is fitted together in the most accurate manner throughout, is thoroughly tested before leaving the shop, and all its adjustments are made with ease and facility.

Parties whose work does not require one of the heavier and more expensive machines, but who desire a machine of low price that can be depended upon, will find it in every way suited to their wants.

The tight and loose pulleys are ten inches in diameter, six-inch face, and should make 900 revolutions per minute.



NO. 2½ PACIFIC

Single Cylinder Patent Planing, Matching, and Beading Machine.

(WITH FOUR AND SIX FEED ROLLERS.)

NO. 2½ PACIFIC

Patent Planing, Matching, and Beading Machine.

SINGLE OR DOUBLE CYLINDER WITH FOUR OR SIX ROLLERS.

This machine, recently designed for a special purpose, has become an indispensable article of our catalogue, and one which has given entire satisfaction wherever used. It will surface to twenty-four inches wide and dress to six inches thick, and will tongue and groove to fourteen inches wide. It is adapted to surfacing for all purposes, matching and beading, and for working special classes of moldings.

The machine is made with either one or two cylinders, and with four or six rollers, as may be desired. The cylinders are of wrought-iron with heavy steel journals, and slotted on all four sides for the accommodation of the different lengths of knives or cutters used for the various purposes, and have pulleys for two driving belts.

The matcher heads are of gun metal, fitted with steel set-screws, and run upon heavy steel arbors. The hangers, carrying the arbors, are adjustable laterally by means of a screw, and are dropped below the line of the bed when it is desired to surface to twenty-four inches in width; this is done in a moment and without removal of the matcher heads or clip. The matcher heads being adjustable across the machine, distributes the friction of the lumber on the bed-plate and prevents unevenness of wear.

The rollers are six inches in diameter, connected by heavy gearing, and for different thicknesses of lumber are geared expansively to open six inches. The rollers are heavily weighted, and flexible to accommodate any inequalities in the lumber. The weighted levers are inside the frame below the platen, and move with perfect freedom. The feed of the machine is very powerful, the rollers being large, and the belting, gearing, and weighting being so proportioned as to allow no slipping.

The cylinder for top planing is carried in heavy boxes, planed to fit to stands cast solid to a bed, extending across the machine. The pressure bar before the cutter is arranged to swing from the cylinder, so that there is always a pressure close to the knife, which prevents tearing out. The pressure bars, both before and after the cut, are adjustable to and from the cylinder to make room for the projection of molding, rustic, or drop siding cutters.

On the double cylinder machine, the lower cylinder has its bearings in a connected frame cast in one piece, adjusted vertically by two screws operated by connecting gearing. The cylinder is slotted on all four sides, has large steel arbors, and pulleys for two driving belts. The pressure bar over the cylinder is also adjusted by two screws, and can be raised to the full thickness of the stuff that can be worked upon the machine. The cylinder is easy of access, and the bars can be adjusted to or from the cut.

The plate under the upper cylinder can be removed for re-planing or renewal when worn out of line. The matcher clip, an important improved feature, is adapted to this machine, and in such a position that a deep rabbet can be made for drop siding.

It is furnished with our double belt tightener, patent solid milled cutters, and pulleys for changes of feed. All bearings are arranged with large oil cavities to insure perfect lubrication, and all parts constructed in the most perfect manner.

It has the patent tight and loose pulleys which are twelve inches in diameter and six inch face, and should make 900 revolutions per minute.

NO. 3 FOUR ROLL

Single and Double Cylinder Patent Planing and Matching Machines.

(L. G. NO. 1.)

Upon the opposite page will be found two engravings, the first representing our No. 3 Single Cylinder Patent Planing and Matching Machine, and the lower engraving that of our No. 3 Double Cylinder Patent Planing and Matching Machine with beading attachment. These machines have recently been very much improved, are strong, heavy, and compact, and will be found well adapted for working hard or soft wood up to twenty-four inches in width and four and one-half inches in thickness in planing and flooring mills, builders, box shops, etc., where a machine of medium size and capacity is required.

The cylinder carries three knives, runs in long, self-oiling bearings of large diameter, is belted on both sides, and fitted with steel lip chip-breakers; also the matching cylinders are fitted with our patent matcher clip, which effectually prevents tearing and splitting in working cross-grained and knotty lumber.

The feed works are of the most superior construction. The feeding rolls being of large diameter driven by very strong patent expansion gearing, are instantly started and stopped by means of our improved belt tightener, and fitted with patent weighting attachment, by means of which a uniform pressure is maintained on the lumber regardless of inequalities in thickness. There are two changes of feed for hard or soft wood.

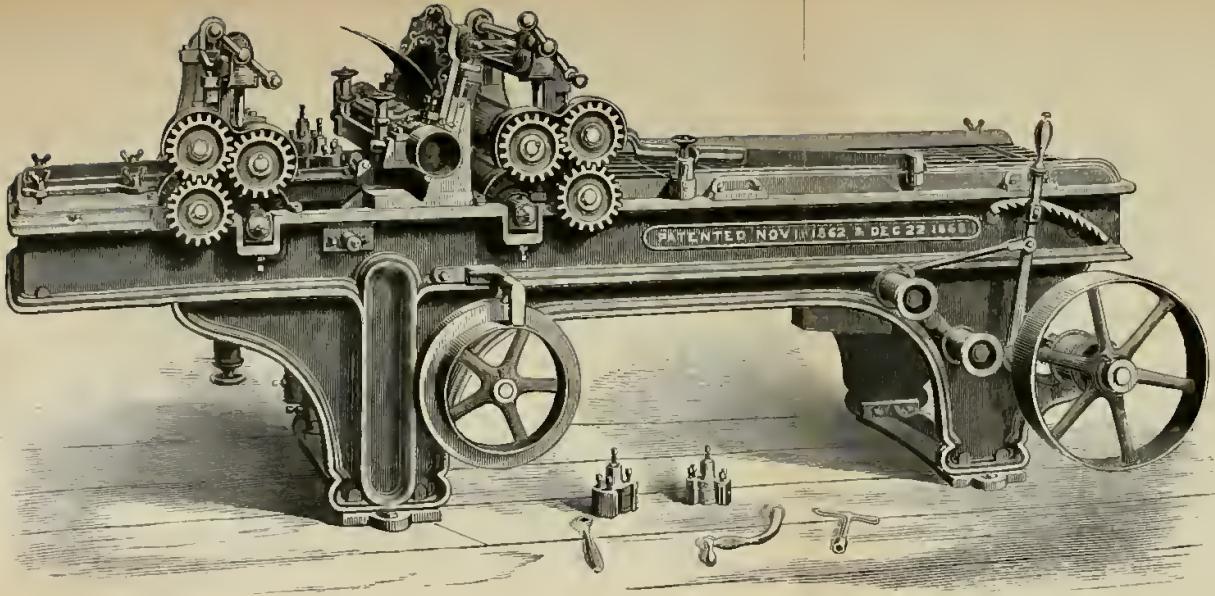
They are also provided with our patent drop matcher attachment for lowering the matcher spindles and heads below the line of the bed when it is desired to surface the full width, and for quickly re-adjusting them to their proper position for working flooring. The matching spindles are of steel, and run in self-oiling bearings, the matcher heads of gun metal, with hardened steel screws.

The under cylinder is easy of access, the pressure bars being movable. The patent beading attachment is placed upon the upper pressure bar over the under cylinder, and is arranged so as to gauge the depth of the bead from and by the surface of the board, which secures an automatic adjustment of the beading shaft at all times.

Every part is made and fitted in the most thorough and accurate manner, and practical working tests are made with each machine before it leaves the shop. Full sets of wrenches, patent solid matcher cutters, improved board guide, patent tight and loose pulleys, countershaft, etc., accompany each machine, and will be found complete and ready to run the moment it is set up and belted.

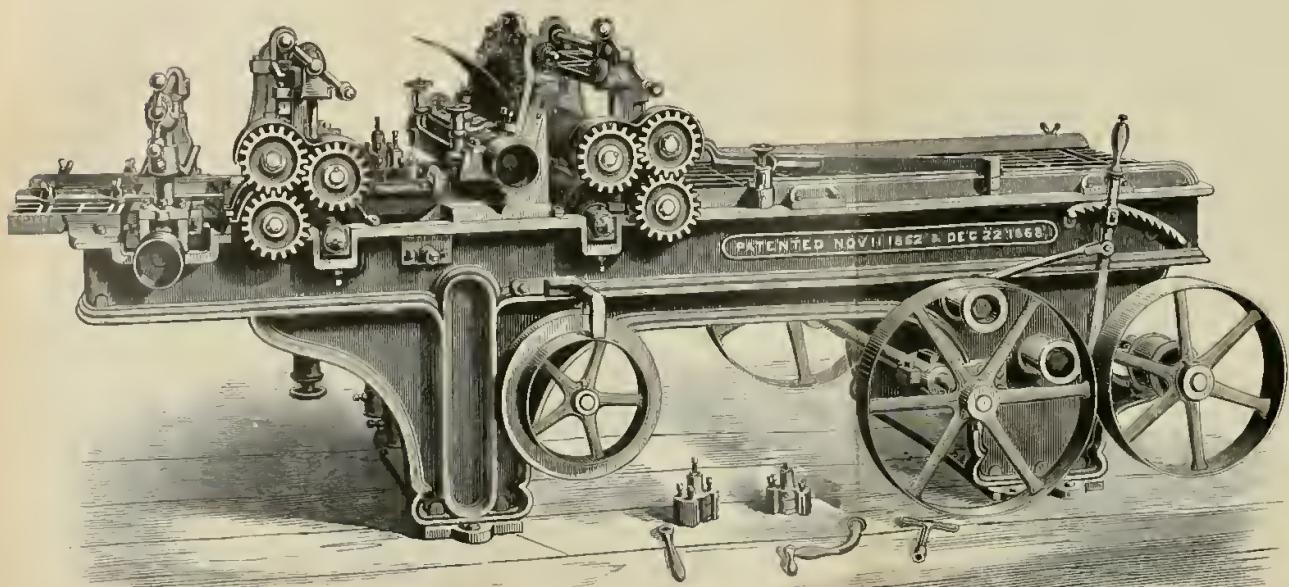
For quantity and quality of work within their capacity they have no equal, and are strongly recommended to parties desiring a good low price machine for all ordinary work.

The tight and loose pulleys are twelve inches in diameter and six inch face, and should make 875 revolutions per minute.

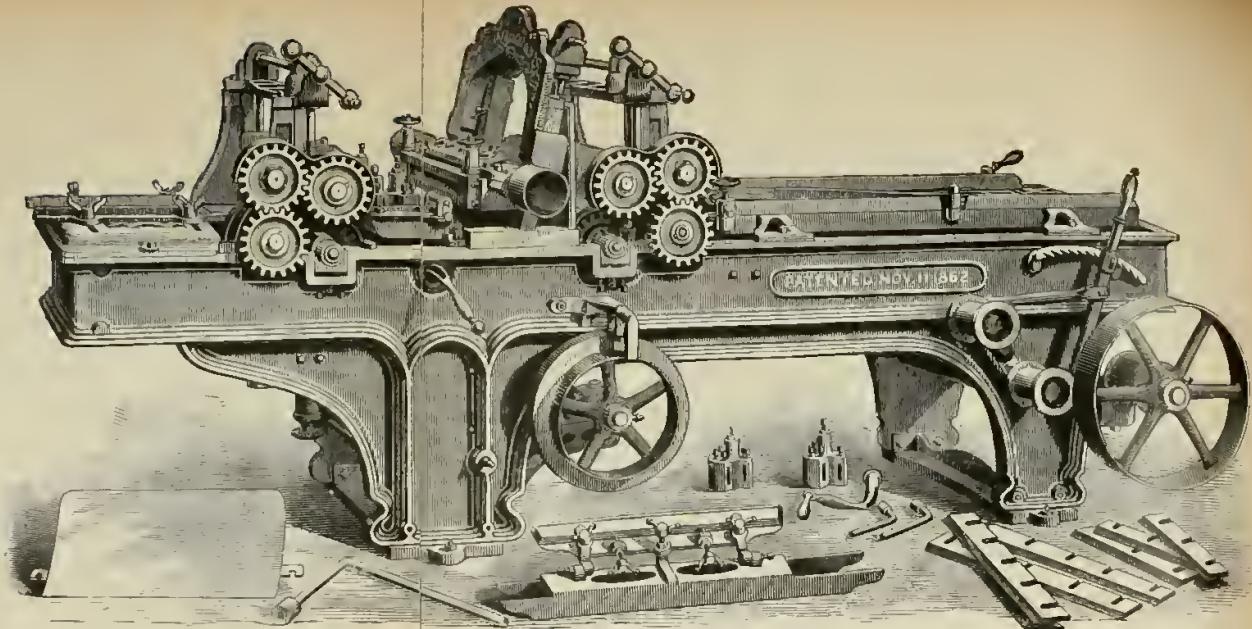


NO. 3 FOUR ROLL
Single Cylinder Patent Planing and Matching Machine.

(SEE DESCRIPTION ON OPPOSITE PAGE.)

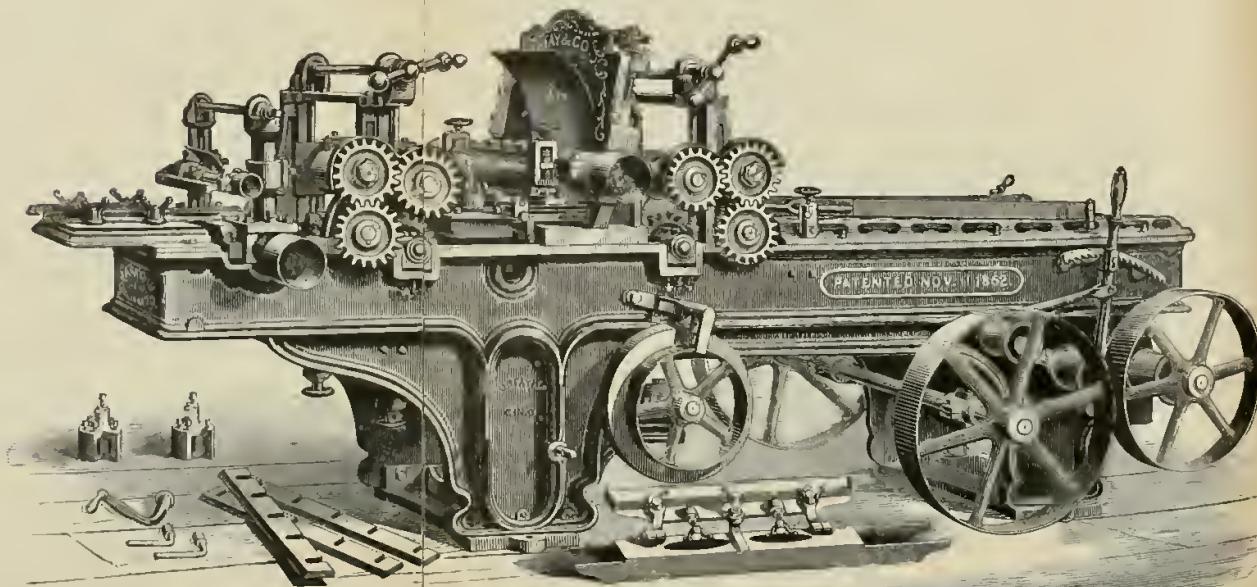


NO. 3 FOUR ROLL
Double Cylinder Patent Planing, Matching, and Beading Machine.
(SEE DESCRIPTION ON OPPOSITE PAGE.)



NO. 4 FOUR ROLL
Single Cylinder Patent Planing and Matching Machine.

(SEE DESCRIPTION ON OPPOSITE PAGE.)



NO. 4 FOUR ROLL
Double Cylinder Patent Planing, Matching, and Beading Machine.

(SEE DESCRIPTION ON OPPOSITE PAGE.)

NO. 4 FOUR ROLL

Single and Double Cylinder Patent Planing and Matching Machines.

(L. G. NO. 2.)

Upon the opposite page will be seen two engravings, the first illustrating our No. 4 Single Cylinder Patent Planing and Matching Machine, and the second our No. 4 Double Cylinder Patent Planing, Matching, and Beading Machine. These machines will surface up to twenty-four inches wide, and from one-fourth to five inches in thickness, and tongue and groove and match up to fourteen and sixteen inches in width, as may be desired.

They combine every convenience for doing the work to the best possible advantage, and embraces all known features for increasing efficiency and durability, and for general work on hard and soft, thick and thin lumber are unequalled.

They are furnished with four six inch feed rolls provided with pivoted boxes and patent weighting attachment, which secures an equal pressure on the stuff being worked, regardless of inequalities in thickness; and the position of the weights is not altered when adjusting the rolls to different thickness of stuff. The rolls are connected by patent expansion gearing of superior construction, which allows the upper rolls to adapt themselves to the varying angles on irregularly sawed lumber. The feed is strong and positive, has two changes for hard and soft wood, and is started or stopped by means of our improved belt tightener.

The cylinders are of large diameter, with large steel journals running in patent self-oiling bearings, arranged to flood the journals constantly with oil, and lined with metal, prepared expressly for our use and perfectly fitted by scraping. They carry three knives with steel lips under each, to receive the wear of the chips and to act as chip breakers on cross-grained and knotty stuff; also, pulleys for two driving belts.

The cylinder back containing the bearings is cast solid in one piece and internally gibbed between two heavy standards; it is adjusted on an angle, and can be raised or lowered while in operation. The bed under the cylinder is detachable, so it can be moved and replanned when worn out of line.

The matcher heads are of steel, and furnished with our patent matcher clip, to prevent the tear at the ends of boards, and also with our patent solid milled matching cutters. The matcher spindles are of steel, and provided with large oil holders for the vertical bearings, and the lower steps are self-oiling.

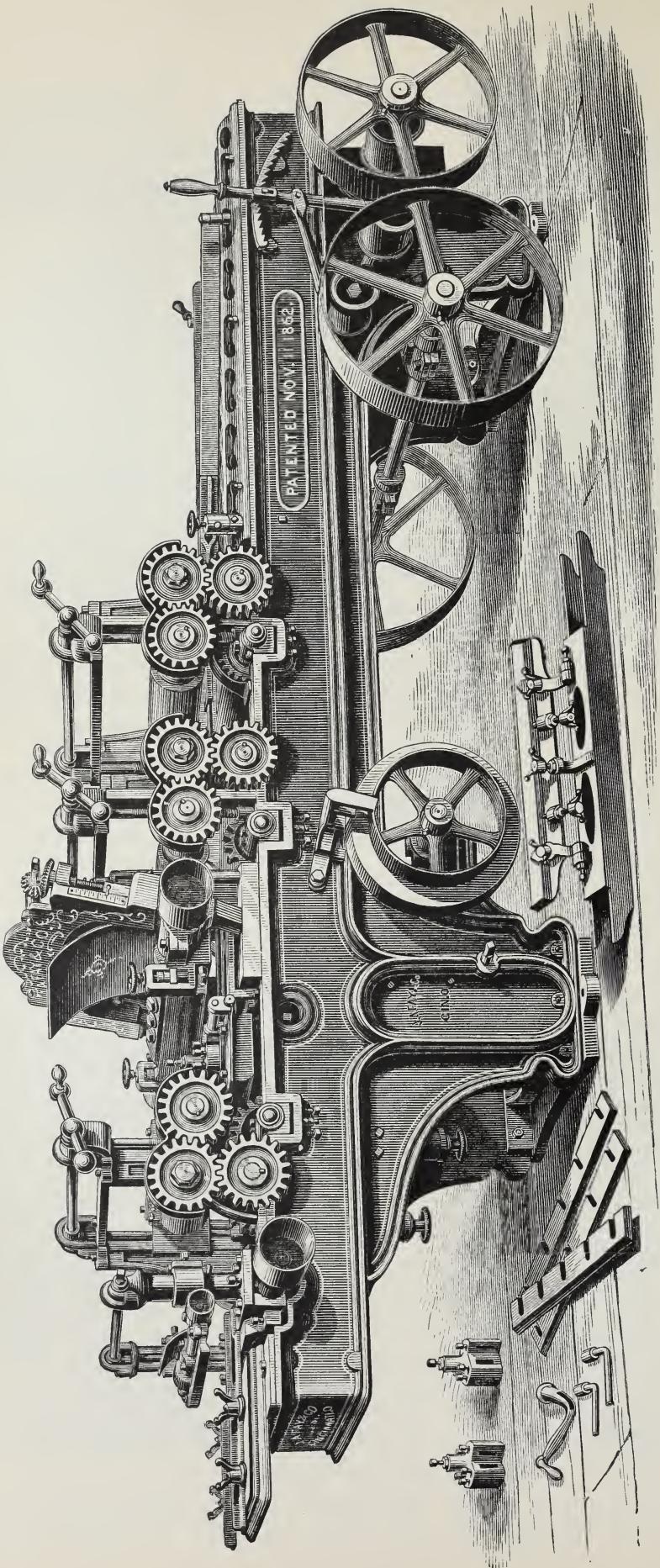
They are provided with our patent drop matcher attachment, by means of which the machine can be changed from a floorer to a wide surfacer or vice versa in a moment's time. This is done by lowering the matcher spindles and heads below the line of the bed or platen, making a large saving of time to the operator.

Each machine will plane twenty-four and tongue and groove fourteen inches wide, and five inches thick, when the matcher heads are lowered.

In the double cylinder machines the under cylinder is arranged with detachable beds, that can be instantly removed or adjusted without interfering with the platen.

The patent beading attachment is placed upon the pressure bar, over the under cylinder, so as to gauge the depth of the bead from the surface of the board, securing an automatic adjustment of the beading shaft at all times.

The patent tight and loose pulleys are furnished without charge. They are twelve inches in diameter and six-inch face, and should make 875 revolutions per minute.



NO. 4 SIX ROLL

Double Cylinder Patent Planing, Matching, and Beading Machine.

(L. G. NO. 2.)

NO. 4 SIX ROLL

Double Cylinder Patent Planing, Matching, and Beading Machine.

(L. G. NO. 2.)

This machine, as recently improved, is one of the most effective in use. It will plane on both sides, and tongue and groove and bead up to fourteen inches wide, and surface both sides twenty-four inches wide and five inches thick. It is built in all its parts entirely of iron, steel, and gun metal, strongly and substantially fitted together in the best manner possible.

The cylinders, two in number, are each provided with three knives, steel-lipped chip-breakers, perfectly finished, long steel journals, and two pulleys, five-inch face for the driving belts.

The matcher heads are of gun metal, each for three cutters, with steel set screws, and placed on vertical steel spindles, running in patent self-oiling boxes and steps.

There are six feed rolls six inches in diameter, connected by a train of heavy gearing, and for expansion are provided with heavy expansion gearing. The rollers can be opened to five and one-quarter inches; they are fitted with the pivoted boxes on substantial stands, and are flexible in working on unevenly sawed lumber.

The dead weights attached to the rollers are hung below the table out of the way, and act in the most free and effective manner.

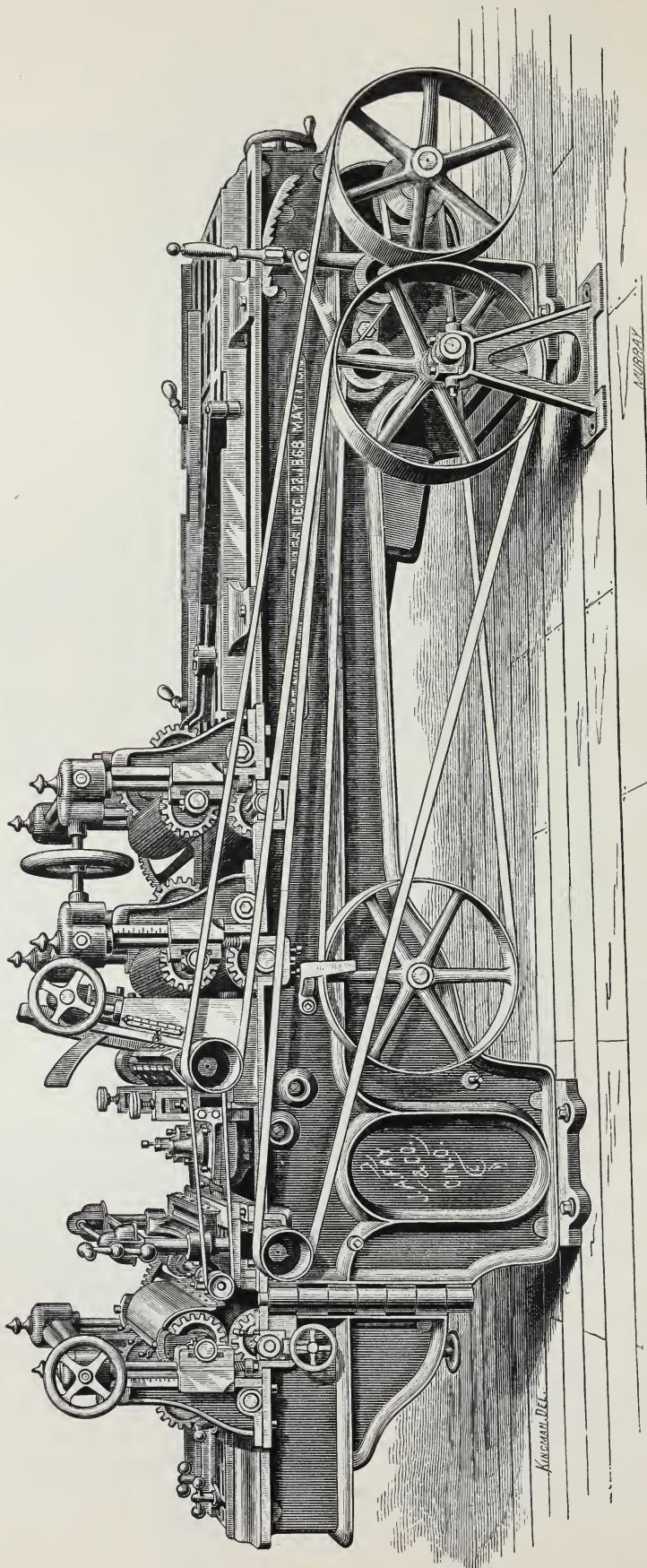
The feed of this machine is constant and even, so many points being acted upon at once precludes the possibility of any intermittent action in the speed.

The upper cylinder is furnished with the internally gibbed back, solidly connected boxes and properly arranged spring roll, and rigid pressure bar to prevent clipping the surface of the board.

The under cylinder is easy of access, the pressure bars being movable, the upper one which contains the beading heads and shaft is raised by two screws connected by rod and bevel gears.

The improved matcher clip, for preventing the tear and splitting in matching cross-grained and knotty stuff, the spring roller for holding flooring against the fence, the patent drop matcher attachment, for changing in one moment from a floorer to a wide surfacer, and *vice versa*, the double pulley feed belt tightener, and self-oiling bearings, the patent tight and loose pulleys, and patent solid milled matching cutters, and other improvements described on pages 37 and 38, are prominent features of this machine, and indispensable. There are changes of feed to accommodate the machine to either hard or soft wood; and by placing larger or smaller pulleys on the feed shaft, the speed can be graduated to suit any kind of lumber.

The tight and loose pulleys are twelve inches in diameter and eight-inch face, and should make 875 revolutions per minute.



NO. 4½ SIX ROLL

Double Cylinder Patent Planing, Matching, and Beading Machine.

(WITH SWINGING END.)

NO. 4½ SIX ROLL

Double Cylinder Patent Planing, Matching, and Beading Machine.

This machine is one of recent introduction, and embodies some features not found elsewhere. It is substantial in its construction, and designed for continuous heavy work.

There are two cylinders with twenty-six inches length of cut, each having two driving belts, and fitted with long heavy steel journals and steel lip chip-breakers. The upper cylinder is carried in a solidly connected internally gibbed back, having heavy bearings for the journals, spring pressure roller before the cut, and a yielding pressure bar after the cut, which retains the lumber in contact with the table and prevents vibration. It is adjustable to the desired thicknesses by screws and connecting gearing, and has a gauge to indicate the thickness.

The under cylinder is placed so that the discharging rollers carry the lumber from it, thus running through and finishing one board, if desired, without another following. The discharging rollers can be swung around, opening the end of the machine and giving access to the under cylinder, so that any adjustment can be made with the greatest facility.

The two vertical side heads are of gun metal, having three knives each, and are adjustable for different widths of lumber to be jointed or tongued and grooved. The side heads are also arranged to drop vertically below the line of the bed, to permit full-width surfacing to be done without removal of the heads from their spindles.

The feeding arrangement consists of six rollers six inches in diameter, in three pairs, connected by heavy gearing, and opening to five inches by heavy expansion gearing at each end of the roller. The upper rollers, before the cut, are raised together by hand wheel and connecting gearing. The under cylinder and its pressure bar are both raised and lowered by screws and connecting gearing, the former to govern the thickness of the cut, the latter for the thickness of the lumber being fed through.

The lower roller in the movable end of the machine has a vertical adjustment to compensate for any change in the elevation of the under cylinder and in order that a constant pressure may be retained upon the lumber by keeping the face of the pressure bar after the cut and the lower discharging roller in the same line.

The platen before the cut of the upper cylinder has an adjustable roller spring bar moved by a hand wheel at the operating end of the machine.

With the special features already described, this machine has all the standard attachments found in other machines, viz.: the double pulley and belt tightener, which govern and graduate the feeding, self-oiling bearings, patent drop matcher attachment, improved clip for the matcher head, patent solid milled matching cutters, and extra pulleys for changes of speed of feed.

This machine will surface to twenty-six inches in width and to five inches in thickness, and match flooring to sixteen inches wide.

It has the patent tight and loose pulleys which are twelve inches in diameter and six-inch face, and should make 900 revolutions per minute.

NO. 5 FOUR ROLL

Single Cylinder Patent Planing, Matching, and Beading Machine.

(MEDIUM.)

The engraving on the opposite page represents a powerful machine with four feed rollers, seven inches diameter, with capacity for planing twenty-four inches wide by six inches in thickness, and matching to sixteen inches wide.

This machine, as indicated by the name, is a medium between our heaviest and the last described six roll planer, and, for constant use, has no superior.

The design throughout the machine is for strength, and resistance to the work intended to be executed upon it.

The cylinder is six and one-half inches in diameter on the periphery of the cutting edge; the journals ten inches in length, with two driving pulleys of six inches face.

The cylinder back is gibbed internally to heavy stands, raised at an angle to insure perfect tension of the driving belts, and provided with roller and rigid pressure bar for preventing surface being clipped, as the end of the lumber passes under the cylinder.

The cylinder is furnished with the chip-breaking steel lips. The matcher heads are of gun metal, with three knives each, steel set screws and steel spindles.

The patent matcher clip to prevent tearing or splitting the lumber in working flooring has no superior.

The patent drop matcher attachment, by which it can be changed from a floorer to a wide surfacer in a moment, and the double pulley belt tightener on the feed belt, also the patent solid milled matching cutters, and the patent tight and loose pulleys are furnished with this machine.

For holding flooring boards against the fence, there is a pivoted arm with a roller on the end; this is worked by a hand wheel in connection with a screw and quadrant rack; the hand wheel being convenient to the operator, it can be adjusted instantly to any width of board.

All the gearing is very heavy, the expansions on the rollers are our patent expansion gearing, with the pivoted boxes and weighted by the lever and dead weight under the platen, and has all the improvements described on pages 37 and 38 of this catalogue.

The tight and loose pulleys on the countershaft are twelve inches in diameter and eight-inch face, and should make 875 revolutions per minute.

NO. 5 LARGE FOUR ROLL

Double Cylinder Patent Planing, Matching, and Beading Machine.

(MEDIUM.)

This machine, of the same general design as the last described four roll planer and matcher, is intended for double surfacing, planing, matching, and beading.

The frame of this machine is very heavy, strongly bolted together with turned bolts, the holes drilled to fit, and all joints and wearing parts fitted in the most thorough and accurate manner.

The rollers are seven inches in diameter, four in number, connected by our heavy patent expansion gearing, and can be opened to take in lumber to five inches in thickness.

They are revolved in pivoted boxes, having long bearings, and heavily weighted from below by the dead weight levers under the machine.

The upper cylinder is hung in long bearings, strongly joined by heavy bars attached to a rigid back, which is open, for the convenience of adjusting the knives; and the journals provided with oil fountains, so arranged as to constantly flood the bearings with oil.

The front pressure bar is regulated in its position by set screws, and, in combination with the roller behind the cylinder, prevents clipping the surface of the lumber.

The under cylinder is easily graduated to different thicknesses of cut, and is arranged with upper and under pressure bars, all of which are adjustable.

The beading attachment is furnished with this machine, for one or both sides, as desired, making the machine capable of completing ceiling, beaded on both sides, planed and matched.

The matcher heads are of large diameter, and revolve on heavy steel spindles made of gun metal, or steel, with steel set screws, and three cutters each. The heavy matcher clip, the double pulley tightening lever for the feed belt, and the pressure arm worked by a hand wheel, for guiding flooring, and all the improvements described on pages 37 and 38 are furnished with this machine.

It is supplied with the patent tight and loose pulleys, also the patent solid milled tonguing, grooving, and matching cutters.

It will surface twenty-four, twenty-six, and twenty-eight inches wide, by five inches thick, and match up to sixteen inches wide. It has also changes of speed, easily adjusted for either hard or soft wood.

The tight and loose pulleys are twelve inches in diameter and eight inch face, and should make 875 revolutions per minute.

NO. 5 FOUR ROLL

Single Cylinder Patent Planing, Matching, and Beading Machine.

(MEDIUM.)

The engraving on the opposite page represents a powerful machine with four feed rollers, seven inches diameter, with capacity for planing twenty-four inches wide by six inches in thickness, and matching to sixteen inches wide.

This machine, as indicated by the name, is a medium between our heaviest and the last described six roll planer, and, for constant use, has no superior.

The design throughout the machine is for strength, and resistance to the work intended to be executed upon it.

The cylinder is six and one-half inches in diameter on the periphery of the cutting edge; the journals ten inches in length, with two driving pulleys of six inches face.

The cylinder back is gibbed internally to heavy stands, raised at an angle to insure perfect tension of the driving belts, and provided with roller and rigid pressure bar for preventing surface being clipped, as the end of the lumber passes under the cylinder.

The cylinder is furnished with the chip-breaking steel lips. The matcher heads are of gun metal, with three knives each, steel set screws and steel spindles.

The patent matcher clip to prevent tearing or splitting the lumber in working flooring has no superior.

The patent drop matcher attachment, by which it can be changed from a floorer to a wide surfacer in a moment, and the double pulley belt tightener on the feed belt, also the patent solid milled matching cutters, and the patent tight and loose pulleys are furnished with this machine.

For holding flooring boards against the fence, there is a pivoted arm with a roller on the end; this is worked by a hand wheel in connection with a screw and quadrant rack; the hand wheel being convenient to the operator, it can be adjusted instantly to any width of board.

All the gearing is very heavy, the expansions on the rollers are our patent expansion gearing, with the pivoted boxes and weighted by the lever and dead weight under the platen, and has all the improvements described on pages 37 and 38 of this catalogue.

The tight and loose pulleys on the countershaft are twelve inches in diameter and eight-inch face, and should make 875 revolutions per minute.

NO. 5 LARGE FOUR ROLL

Double Cylinder Patent Planing, Matching, and Beading Machine.

(MEDIUM.)

This machine, of the same general design as the last described four roll planer and matcher, is intended for double surfacing, planing, matching, and beading.

The frame of this machine is very heavy, strongly bolted together with turned bolts, the holes drilled to fit, and all joints and wearing parts fitted in the most thorough and accurate manner.

The rollers are seven inches in diameter, four in number, connected by our heavy patent expansion gearing, and can be opened to take in lumber to five inches in thickness.

They are revolved in pivoted boxes, having long bearings, and heavily weighted from below by the dead weight levers under the machine.

The upper cylinder is hung in long bearings, strongly joined by heavy bars attached to a rigid back, which is open, for the convenience of adjusting the knives; and the journals provided with oil fountains, so arranged as to constantly flood the bearings with oil.

The front pressure bar is regulated in its position by set screws, and, in combination with the roller behind the cylinder, prevents clipping the surface of the lumber.

The under cylinder is easily graduated to different thicknesses of cut, and is arranged with upper and under pressure bars, all of which are adjustable.

The beading attachment is furnished with this machine, for one or both sides, as desired, making the machine capable of completing ceiling, beaded on both sides, planed and matched.

The matcher heads are of large diameter, and revolve on heavy steel spindles made of gun metal, or steel, with steel set screws, and three cutters each. The heavy matcher clip, the double pulley tightening lever for the feed belt, and the pressure arm worked by a hand wheel, for guiding flooring, and all the improvements described on pages 37 and 38 are furnished with this machine.

It is supplied with the patent tight and loose pulleys, also the patent solid milled tonguing, grooving, and matching cutters.

It will surface twenty-four, twenty-six, and twenty-eight inches wide, by five inches thick, and match up to sixteen inches wide. It has also changes of speed, easily adjusted for either hard or soft wood.

The tight and loose pulleys are twelve inches in diameter and eight inch face, and should make 875 revolutions per minute.

NO. 5 LARGE SIX ROLL

Patent Planing Matching and Beading Machine.

(WITH DOUBLE BEADING ATTACHMENT.)

The engraving on the oposite page represents our Large No. 5 Six Roller Double Cylinder Planing and Matching Machine, with upper and lower beaders.

The length of this machine is fourteen feet, and it is similar in design to the No. 5 Four Roll Planing Machine on the preceding pages.

The superiority of this machine consists in the three pairs of rollers, giving three points of contact in feeding the lumber to the cutters, causing the rate of speed of the lumber to be constantly the same, regardless of unevenness of sawing.

The rollers are seven inches in diameter, open to take in lumber five inches in thickness, are connected by train of heavy gearing to render their speed uniform, and each pair is connected by our patent heavy expansion gearing.

The weighting arrangement is such, that the rollers can be raised without moving the dead weight levers, and the same pressure is retained at whatever height the rollers may be adjusted.

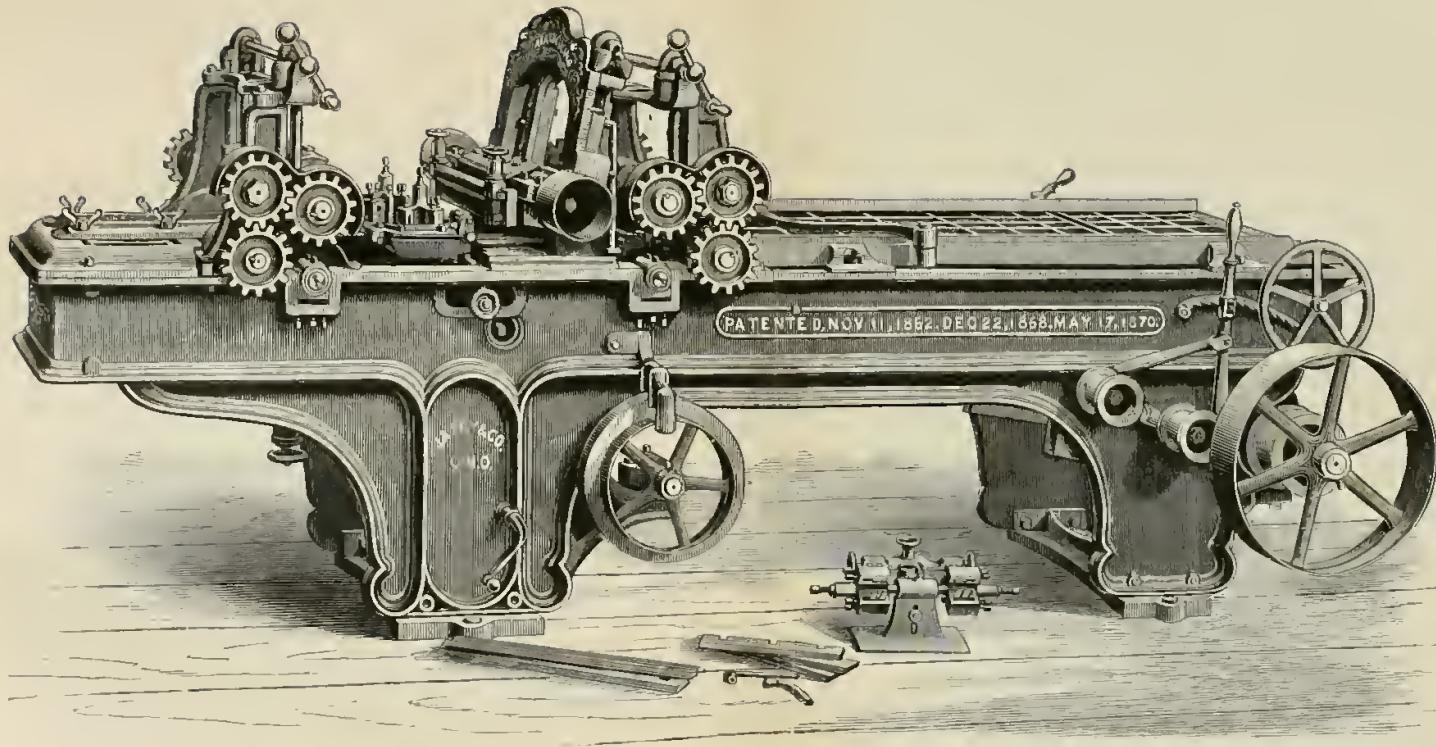
The upper cylinder is furnished with steel chip breaking lips, long steel journals, internally gibbed back, and heavy stands cast solid to the bed. The face of the bed can be removed for adjusting or replaning. The pressure bar and roller for the upper cylinder are complete in their construction, accomplishing the prevention of clipping in the most perfect manner. The under cylinder is of the same construction as the upper, with adjustable pressure bars.

Three wing gun metal or steel matcher heads, supplied with our patent solid milled cutters, which are unequalled for working hard and cross-grained lumber, are furnished. The matcher spindles are very large and heavy, and run in self-oiling bearings, and are adjustable vertically by means of the patent drop matcher attachment.

Incorporated in this machine, are the patent matcher clip, feed belt tightener, pivoted roller boxes, patent expansion gearing and self-lubricating bearings, and all the improvements enumerated on pages 38 and 39.

This machine is equally adapted for hard or soft lumber, and is readily adjusted for surfacing one or both sides, for making flooring or ceiling, or for squaring up on both sides.

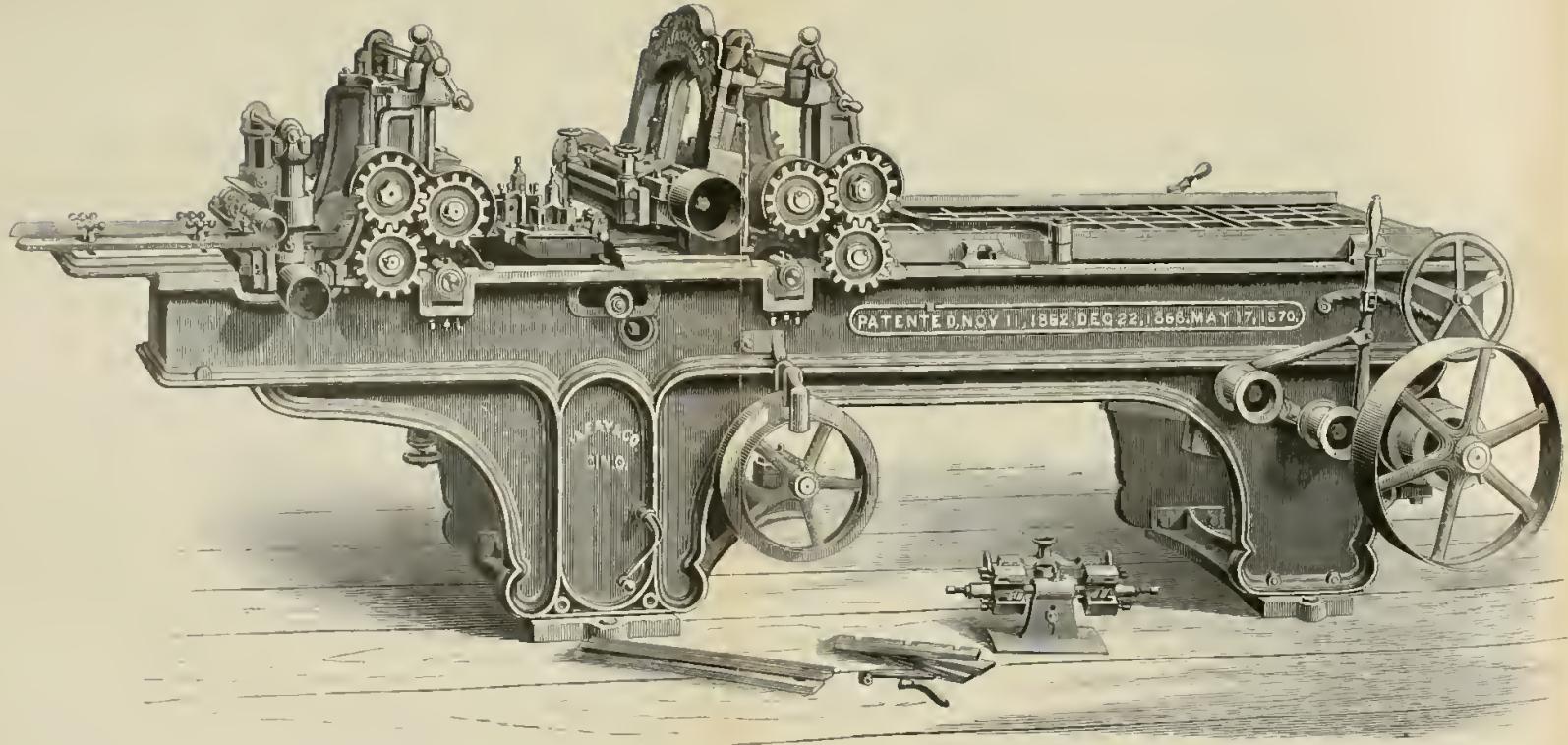
The tight and loose pulleys are twelve inches in diameter and eight-inch face, and should makes 875 revolutions per minute.



J. A. FAY & CO.'S

No. 5 Four Roll Single Cylinder Patent Planing, Matching, and Beading Machine.

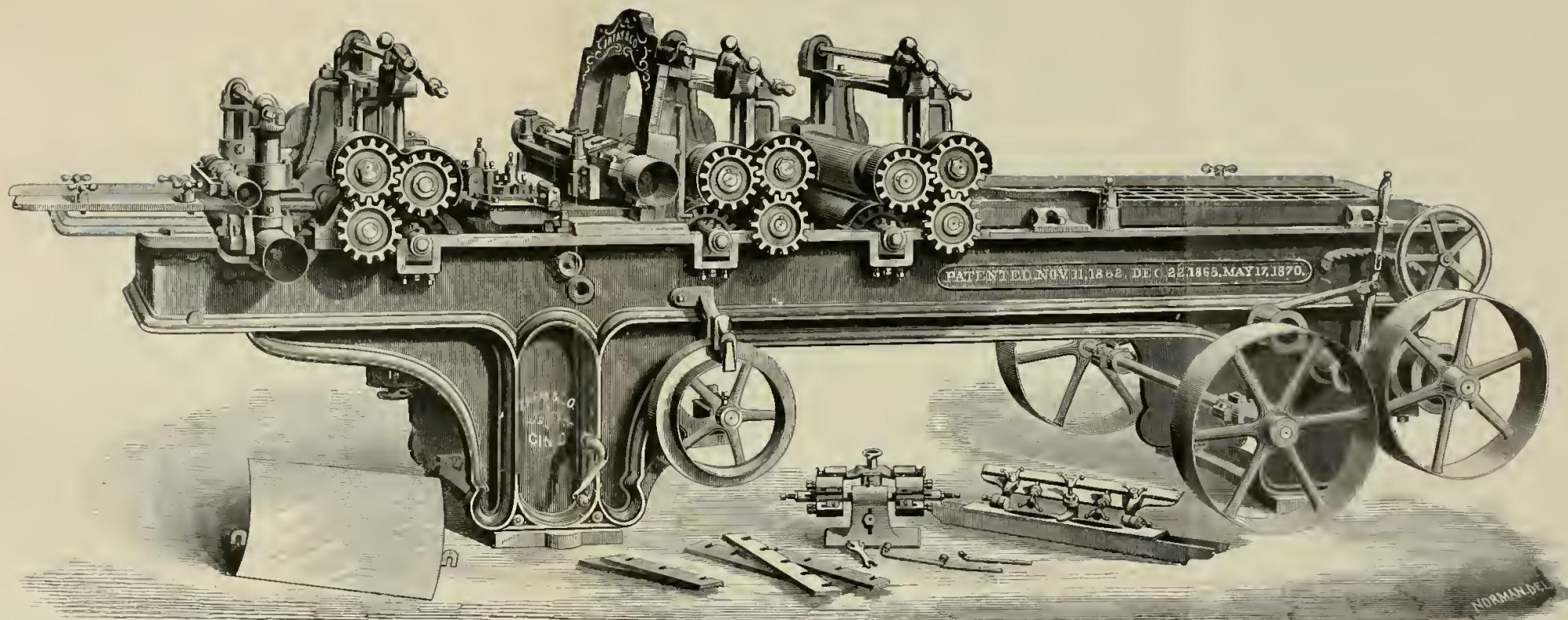
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J. A. FAY & CO.'S

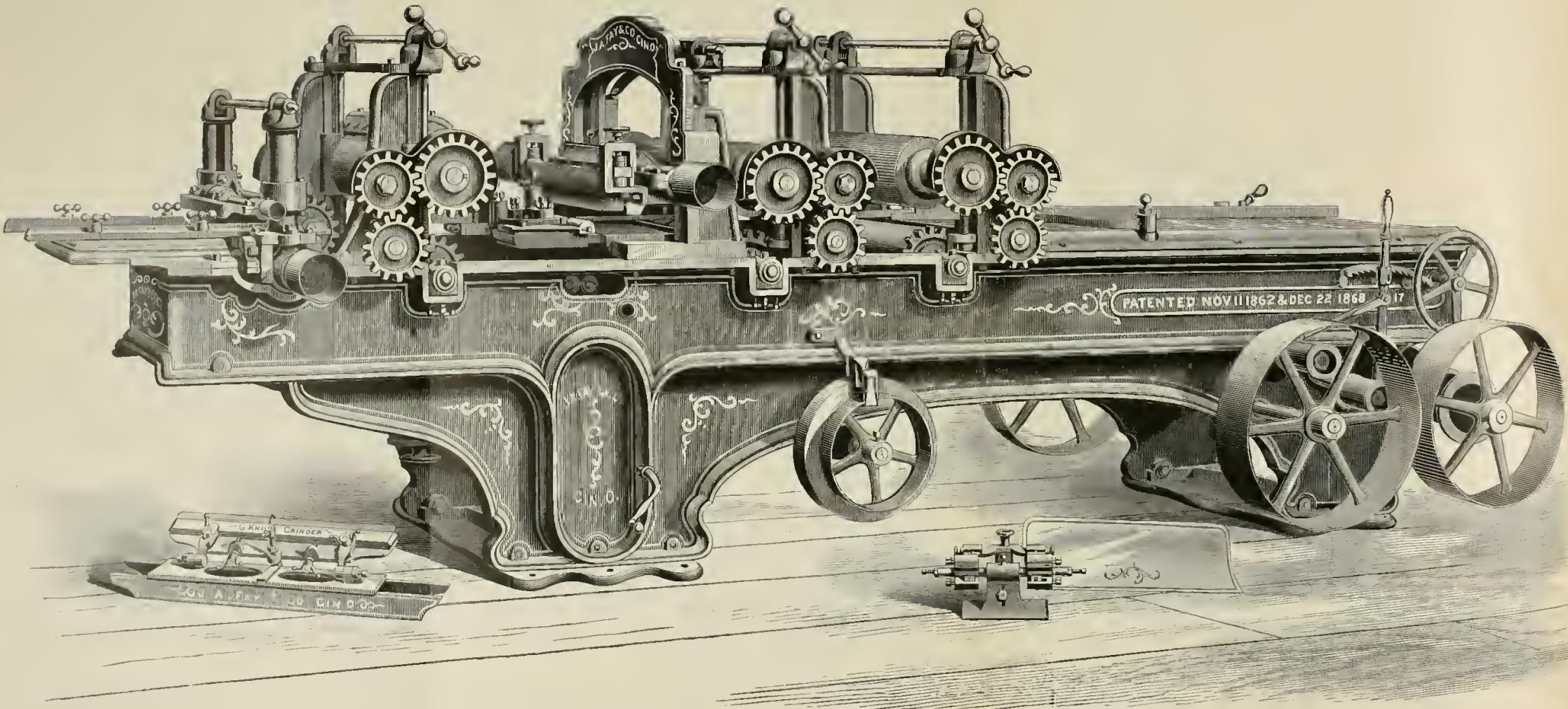
No. 5 Four Roll Double Cylinder Patent Planing, Matching, and Beading Machine.

(MEDIUM.)



J. A. FAY & CO.'S

No. 5 Six Roll Large Double Cylinder Patent Planing, Matching, and Beading Machine.



J. A. FAY & CO.'S

No. 6 Six Roll Large Double Cylinder Patent Planing, Matching, and Beading Machine.

NO. 6 LARGE SIX ROLL

Double Cylinder Patent Planing, Matching, and Beading Machine.

(WITH DOUBLE BEADING ATTACHMENT.)

This is our largest Planer and Matcher. It is designed for the heaviest and most constant service, and will be found, upon examination, to fill all the requirements of those wanting a machine that is capable of great endurance.

There are six rollers, eight inches in diameter, very heavily geared, each pair connected at each end by our patent expansion gearing; they are heavily weighted, and while in motion can be raised without changing the position of the weights and levers.

The roll boxes are pivoted, this device increasing the efficiency of the machine, as the rollers being more constantly in contact with unevenly-sawed lumber, accommodate themselves to a variation of three-fourths of an inch in twenty-four inches.

The cylinder is gibbed to heavy stands, cast solidly to the bed that supports the friction plate over which the lumber passes in being planed, making all parts solid and substantial. The upper cylinder is six and three-quarter inches in diameter, made of the best metal, with three knives, heavy steel journal one and three-quarter inches in diameter, and steel lips for receiving the wear of the chips.

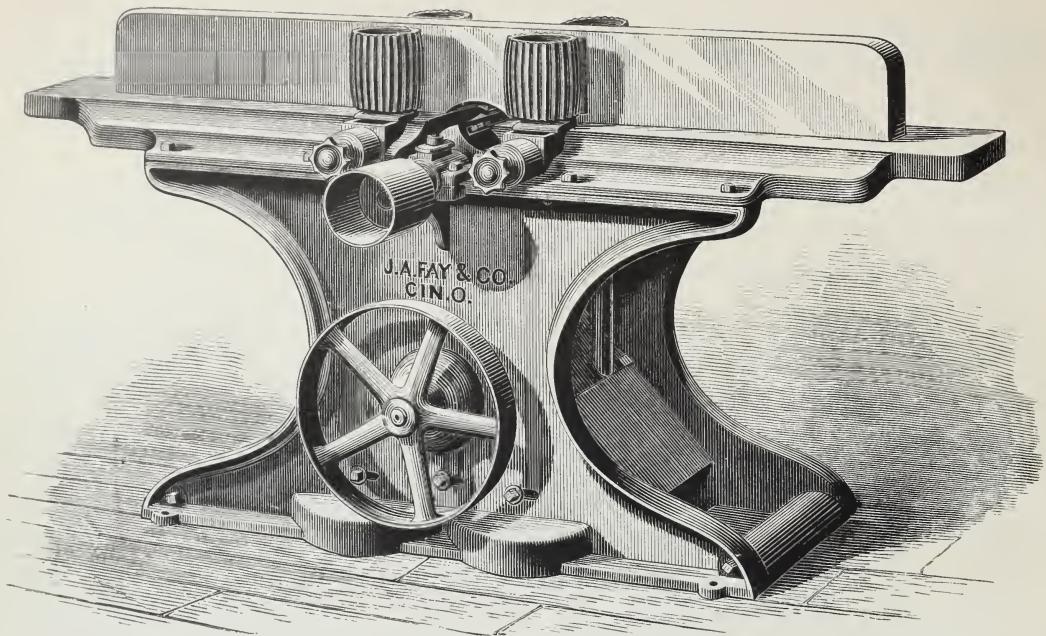
The under cylinder is of the same construction as the upper, close to the end of the machine, can be easily adjusted, and has the necessary movable pressure bars, the upper one being adjusted vertically, parallel with the cylinder, by two screws geared together.

The matcher heads of gun metal or steel, of large diameter, have three wings, and are attached to large steel spindles, running in very heavy hangers, which are adjusted vertically by the patent drop matcher attachment, and have a lateral adjustment by independent screws.

The patent solid milled matching and grooving cutters, also the patent tight and loose pulleys, described on page 16, are furnished with this machine.

There is a continuous fence from the end of the machine to the matcher head, a pressure guide to retain the lumber against the fence, and a heavy matcher clip to prevent tearing or clipping the lumber, making this a perfect flooring machine as well as double surfacer. If desired, beading attachments may be added above or below, or both, making the machine complete in all details. It has all the improvements enumerated on pages 38 and 39, and the whole machine is constructed in the most thorough manner, and is severely tested before shipment to insure perfect working in all its functions, and nothing is neglected that experience can suggest to give satisfaction to the operator.

The tight and loose pulleys are fourteen inches in diameter and eight-inch face, and should make 875 revolutions per minute.



Power and Hand Feed Matching Machine.

This is a substantial machine, intended for tonguing and grooving short stuff for boxes, bottom boards for wagons, sheathing, and work that is not parallel on its edges or of equal widths.

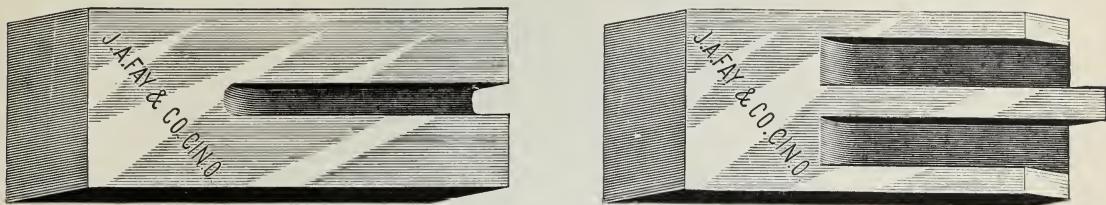
The two heads, one for tonguing and one for grooving, are run on a heavy steel arbor under the table, which is planed to take up the cut as the work passes over the cutter.

The feeding arrangement is very strong, consisting of four feeding rollers, driven by a heavy train of gearing connected to the arbor by a belt; changes of feed can be made by changing the size of the pulley.

The fence is rigid in its position, has two idler rollers to relieve it from friction, and the heads and driven rollers are adjusted to it for different thicknesses of stuff, which is passed over the heads between the rollers and the fence and returned in the opposite direction.

The machine can be constructed for hand work alone, or can be combined and used as either a power or a hand machine.

The pulley on the arbor is four inches in diameter and five-inch face, and should make 3300 revolutions per minute.



Patent Solid Milled Matching and Grooving Cutters.

We take pleasure in presenting herewith engravings of our Patent Solid Milled Cutters for tonguing and grooving lumber. They are made of the best English cast-steel, in superior style and finish, so the opposite end can be used for jointing, and will be found to be the most efficient and durable of any in use, and are rapidly superseding all others. Owing to the improved method of constructing them in one solid piece, they are unequaled in the quantity of work which can be produced, for the following reasons.

First—The shape of the cutter being governed by the angle to which the cutter is ground, it is constantly retained the same, avoiding the liability to change by wear or sharpening, that is found in the ordinary cutters.

Second—The angle side of the cutter being made to work towards the cut, the final cutting point is brought at nearly right angles to the surface, thus producing a scraping cut, which leaves the work smooth and complete without further labor.

Third—The cutters are set to position much more readily than the old style of bits, thus effecting a saving both of time and labor, and actual use has established the fact that they possess more than double the durability of the ordinary style of cutters.

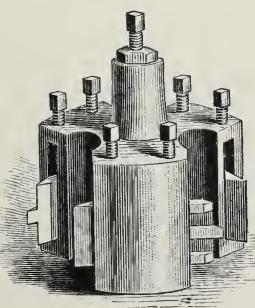
In placing the cutters in the heads, be careful to insert them in the opposite way from the ordinary cutters, i. e., with the bevel of the bit towards the cut, as will be seen by the accompanying engraving below.

PRICES AND SIZES

PATENT SOLID MILLED TONGUING AND GROOVING CUTTERS.

In Sets of six for three Knife Matcher Heads.

Size of T. and G.	Width of Cutter.	Price Per Set.
$\frac{1}{8}$ inch.	$1\frac{3}{8}$ inch.	\$7 50
3-16 "	$1\frac{3}{8}$ "	7 50
$\frac{1}{4}$ "	$1\frac{1}{2}$ "	7 75
5-16 "	$1\frac{1}{2}$ "	7 75
$\frac{3}{8}$ "	$1\frac{5}{8}$ "	8 25
$\frac{1}{2}$ "	$2\frac{1}{4}$ "	9 00
$\frac{5}{8}$ "	$3\frac{1}{4}$ "	11 25

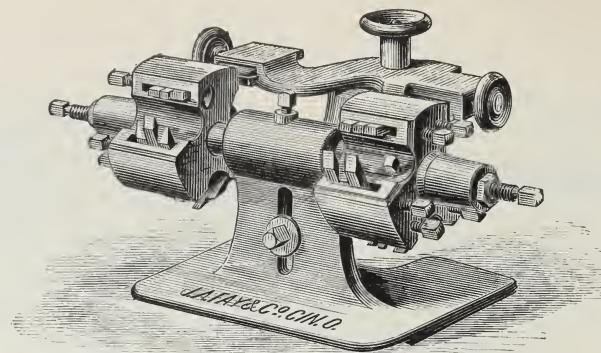


MATCHER HEAD.

In Sets of four for two Knife Matcher Heads.

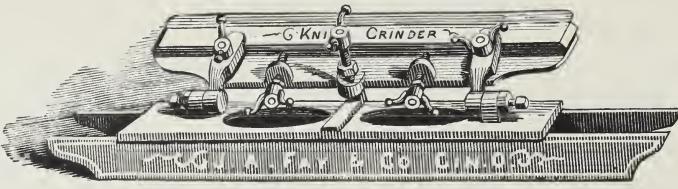
Size of T. and G.	Width of Cutter.	Price Per Set.
$\frac{1}{8}$ inch.	$1\frac{3}{8}$ inch.	\$5 25
3-16 "	$1\frac{3}{8}$ "	5 25
$\frac{1}{4}$ "	$1\frac{1}{2}$ "	5 25
5-16 "	$1\frac{1}{2}$ "	5 25
$\frac{3}{8}$ "	$1\frac{5}{8}$ "	5 75
$\frac{1}{2}$ "	$2\frac{1}{4}$ "	6 00
$\frac{5}{8}$ "	$3\frac{1}{4}$ "	7 50

A full stock of the principal sizes constantly on hand. Cutters for any make of machine can be supplied at short notice. In ordering, send an old bit or sketch, or, what is better, a pattern made of wood, showing size and width of tongue and groove.



Improved Matcher Bit Setter.

This machine is a favorite wherever used, for its simplicity and perfect adaptation to the wants of planing machine operators. It is shown in the engraving with the old form of cutters in the matcher heads. In using with the patent solid milled cutters, the bevel of the cutter should be placed on the under side. It will receive almost any size of head, and is quickly adjusted to any size of cutters. It is a very useful machine, always ready and reliable, and will pay for itself in a short time, in the saving of labor alone, over the ordinary way of setting cutters.



Knife Grinding Machine.

This machine is intended especially for grinding planing knives, etc., and produces a perfectly straight edge and true bevel, in one-fourth the time that it can be done by hand. It consists of a frame, having a sliding carriage, to which the knife is fastened [readily attached to any grindstone frame]. It is quickly adjusted to bring the edge of the knife against the stone; also to give any bevel desired; when set it is moved back and forth by hand. By its use, both the knife and stone are kept in much better working order, and both will last much longer.

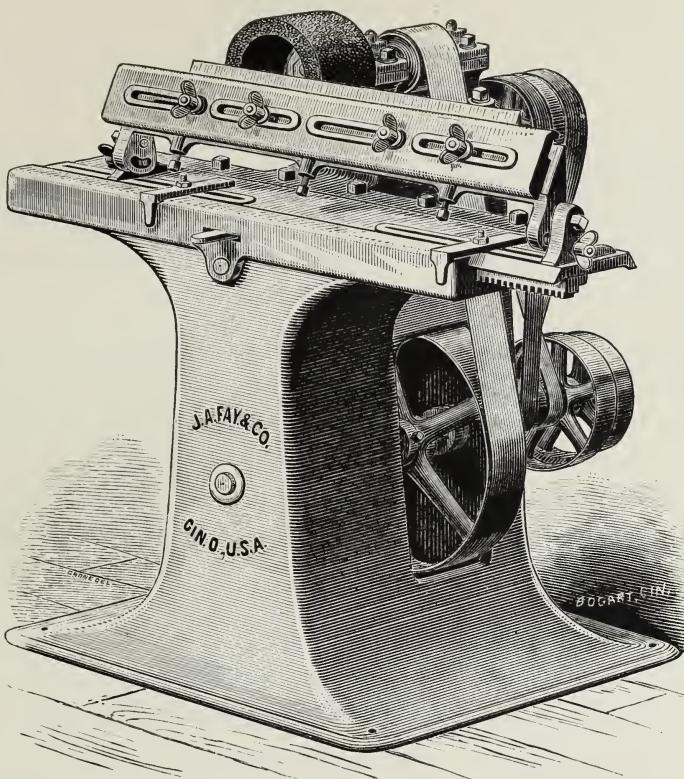
Planing Knives.

We can furnish planing knives, of any style or dimension, on short notice. Also, matching and molding cutters, etc. Parties ordering will please send a paper pattern of knife or cutter, conforming to the directions given below.

DIRECTIONS FOR ORDERING PLANING KNIVES:—



Place the knife face down upon paper; mark around to give the length, width and position of the slots; then turn the knife upon the end and mark around to give the thickness and bevel. Always give the original dimensions on the pattern, thus: $24 \times 3\frac{1}{2} \times 3$.



Power Automatic Knife Grinding Machine.

The above engraving represents a very perfect machine constructed expressly to meet the requirements of planing mills, sash and door factories, agricultural shops, etc. It is simple and substantial, easily taken care of, and for reducing cutters to a sharp keen edge, has no equal. It will sharpen planing knives of all kinds, long and short, giving them a perfectly true bevel and straight edge.

For planing soft wood the best angle for grinding the cutters is about twenty-five degrees. For very hard wood it should be increased. The frame is of neat design, made in one solid casting of cored section, and has a large floor base. A cup, instead of a disc-wheel, is used, as the knife is ground to a more accurate bevel, less convex, and this form of wheel will last longer and can be replaced at half the expense of the other. In grinding, a light cut is recommended.

The arbor is large, runs in bearings upon the head plate, arranged to move forward as the wheel is reduced in size by wear. By changing the stops on the front edge of the platen, the carriage will traverse forward and back to suit the length of the knife to be sharpened, which is clamped in a swinging frame, adjustable to different angles. After being started it will run until the knife is ground to a perfect edge, requiring no further attention from the operator, as, when ground to the gauge set, it stops.

It occupies much less space than the grindstone, is much neater and cleaner, as the use of water is not required, besides the edge upon the knife is made with perfect accuracy.

The tight and loose pulleys are eight inches in diameter, and three and a half-inch face and should make 550 revolutions per minute.

Molding Machines.

The general increase in the use of moldings for building purposes, cabinet and car making, has created a demand for machines for their production, of great capacity of execution in speed and finish, as well as adaptability for other purposes, so that the powers of the machine may be constantly utilized.

In this class of machinery we have, since our last general catalogue, made great advances and improvements, and have perfected from new designs machines that we can confidently recommend to parties requiring them, as being perfectly reliable and durable, and consequently, to users, the most profitable and labor saving of any in the country. The proof of these assertions, and of the popularity of the machines, is found in the large number in use throughout this and foreign countries, and in the constantly increasing demand.

Believing no machine can prove of profit to the operator in which an inferior quality of material or workmanship is employed, for the purpose of producing a low-priced tool, we use only the best attainable material, designed and shaped by skilled workmen, under the supervision of men who have a knowledge acquired by long and careful study of the wants of manufacturers of moldings.

Each of our machines is subjected to a thorough test after completion, thus guarding against any possible defect in the workmanship, and securing the accuracy of fitting and nicety of adjustment required for the production of a perfect molding.

Molding machines are divided into special classes, each class being again divided into sizes. The outside molding machines have the bed with two or three of the heads outside of the frame of the machine. The inside molding machines have all of the heads and the table inside the frame of the machine.

The Universal Wood Worker is a combination of the Outside Molding Machine, with a machine for planing out of wind, grooving, gaining, etc. These are all designed for straight work.

The Edge Molding Machine has the heads placed vertically in the table, and is designed for molding the edges of carved work, and the Carving and Recess Molding Machine for a variety of bracket or face molding peculiar to its construction.

The Outside Molding Machines are now most commonly used, and can be adapted for various purposes besides molding, as working flooring and ceiling. They are constructed with one, two, three, or four heads, according to the character of the work to be done.

The Inside Molding Machines are constructed with three or four cutter heads, and are adapted to surfacing, or any work to twelve inches in width, being designed for the production of light and heavy moldings, and general work of every description, and, when furnished with matching heads, can also be used for tonguing and grooving flooring and ceiling up to twelve inches in width.

These machines are constructed by us, with heavy weighted feed rolls expansively geared, slotted steel cylinders for upper and lower arbors, slotted side heads of gun metal or steel, vertical adjustment of the upper cylinder, improved clip for preventing tearing in working cross-grained lumber, flexible pressure bars, and other features which will commend themselves to the experienced operator.

The cylinders and side heads of these machines are usually made to take on four knives, having slots planed on all four sides, and their adjustments are such as to enable them to be easily set to accurate positions in the shortest time and with perfect certainty.

The Edge Molding Machines are of various designs with one or two spindles, the single spindle machine being constructed to reverse its cutting direction while in operation; the two spindle machine having the cutting direction running opposite.

The Carving or Recess Molding Machine is of recent introduction. It is designed for working forms of panels in the face of the work, and can be adapted to general uses in edge molding. This is an entirely new machine, and for the purposes intended has no superior.

Engravings of these machines, with their various cutter heads, also our improved solid milled molding, friezing, and recess paneling and penciling cutters, with detailed descriptions, will be found in the following pages, to which attention is invited.

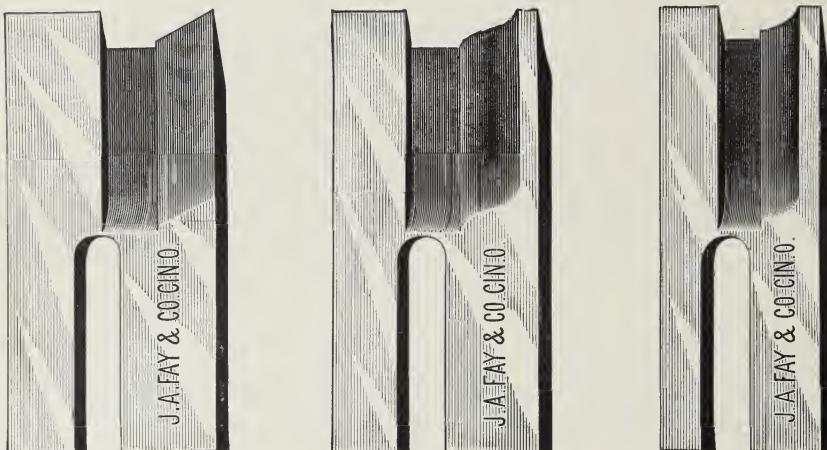
Solid Milled Sash and Door Cutters.

These molding cutters are adapted for any standard work, as for door, sash, blind, or blind stile cutters, beads, or small moldings. They are formed by milling into the face of the steel, instead of cutting the desired shape of the molding on the edge and then grinding to a bevel. In the latter method the form of the molding is liable to be changed when sharpening the cutter.

The form of the molding made by the solid milled cutter is retained permanently by grinding to the standard bevel of the cutter. These cutters are placed on the head with the ground angle towards the direction of the revolution of the head, thus making the cut of the bit come nearly at right angles to the surface, forming a scraping cut and leaving a perfect surface for finishing.

The cutters being made in their dimensions, they are much more easily set than the old form of molding cutters, and their durability is greater, the methods of sharpening them being much more accurate.

SASH CUTTERS.



DOOR CUTTERS.

Bevel, Ogee, and Ovolo.

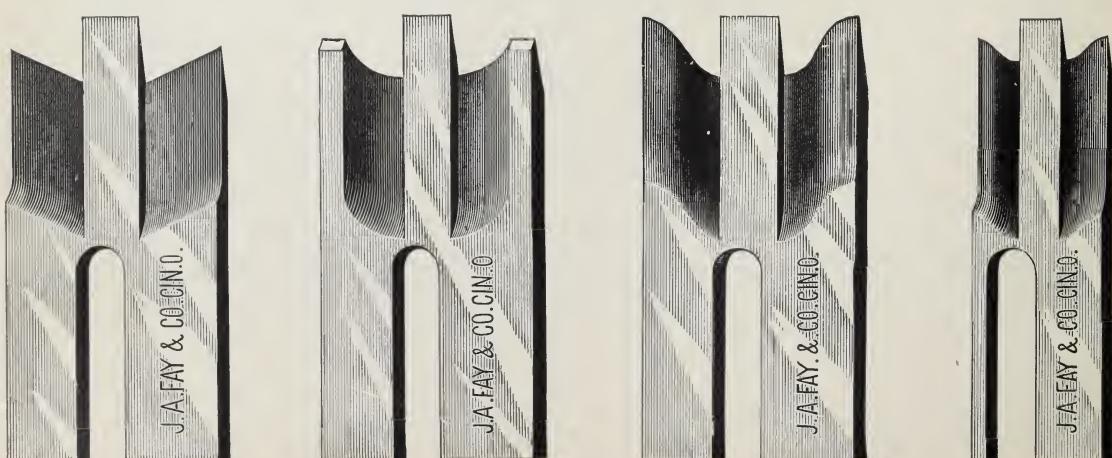
Thickness of Door.	Width of Cutter.	Price per Pair.	Thickness of Door.	Width of Cutter.	Price per Pair.
1 inch.	1½ inch.	\$2 75	1¾ inch.	1¾ inch.	\$3 50
1⅔ "	1½ "	3 00	2 "	2 "	4 00
1½ "	2 "	3 50	2¼ "	2¼ "	4 00

SASH CUTTERS.

Bevel, Ogee, and Ovolo.

Thickness of Sash.	Width of Cutter.	Pair. Price per
1¼ inch.	1½ inch.	\$2 75
1⅔ "	1½ "	3 00
1¾ "	2 "	3 25
2 "	2¼ "	3 50

DOOR CUTTERS.





FLAT AND OVAL.



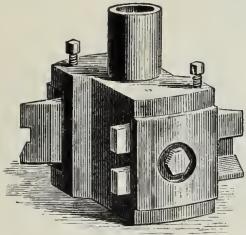
COVE, OGEES OR ROUNDED EDGE.

Solid Milled Blind Slat and Stile Cutters.

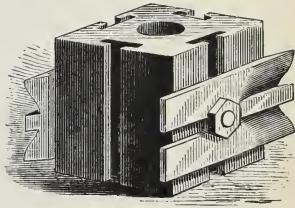
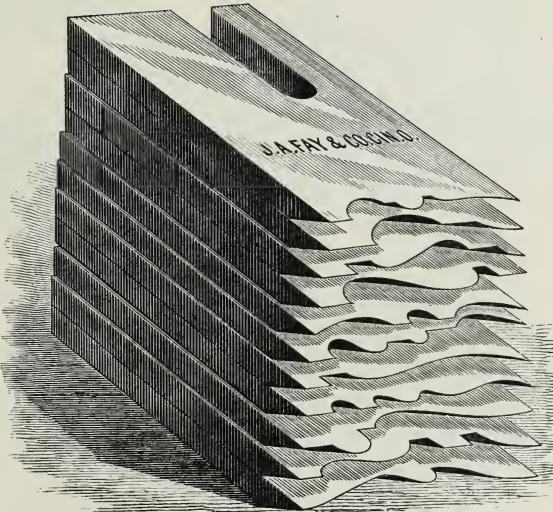
Width of Slat.	Pair.	Width of Slat.	Pair.	Width of Slat.	Pair.	Width of Slat.	Pair.
1 inch,	\$2 50	1 1/4 "	\$2 50	1 1/2 inch,	\$2 75	1 1/8 "	\$3 00
1 1/8 "	2 50	1 3/8 "	2 75	1 3/4 "	2 75	Cove, or Round Edge,	2 75

Blind Rod Cutters.

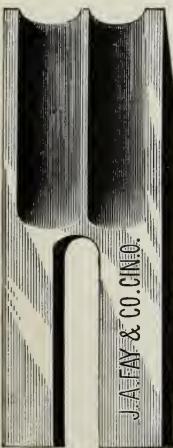
For 9-16, 5/8, or 3/4 inch Rods, per pair, \$2 50



CAPPED HEAD.



FOUR SIDE SLOTTED HEAD.



Size.
1/8 to 1/2 inch,
9-16 to 1 "
1 1/16 to 2 "

Single or Double Bead and Blind Rod Cutters.

From 1/8 to 1 1/2 inch, by 1-16ths.

Width. Price Per Pair.
1 1/2 inch \$2 50

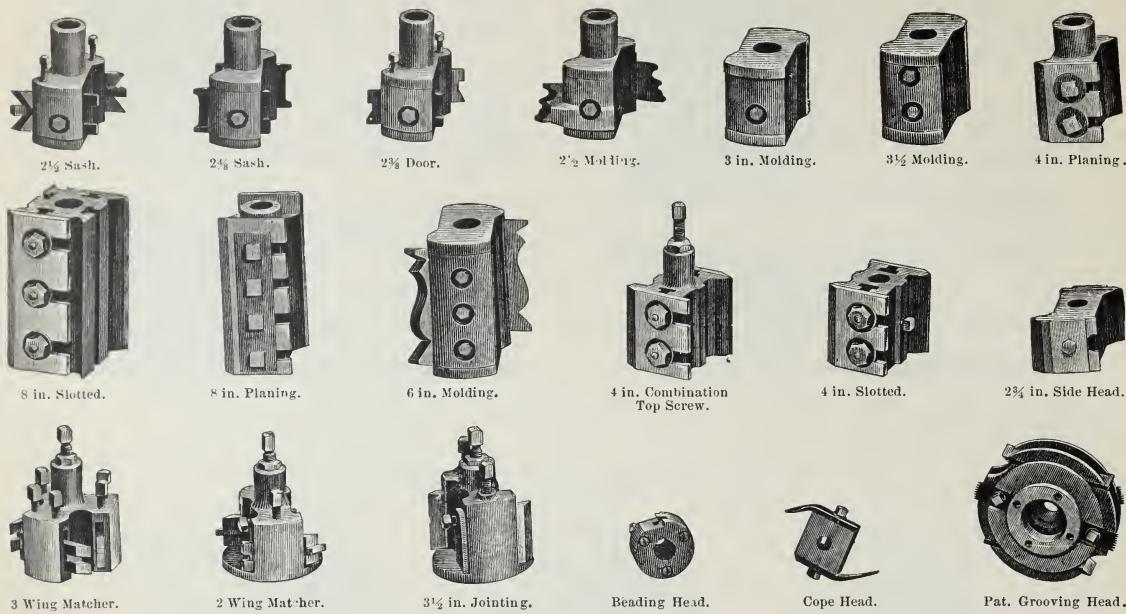
1 3/4 " 2 75

2 " 3 00

Small Bead Tools for Planing Machines, 75 cents each.



The engravings of heads illustrated above show the manner in which the Solid Milled Cutters should be applied to cap and square heads.



HEADS FOR Sash, Molding, Matching, Gaining, etc.

The assortment and variety of heads illustrated above will be found very complete, including sash, door, straight cap, and slotted molding heads, panel heads, also for matching, gaining, beading, coping, etc., suited to any class of work, or any style of machine.

The matching heads are made both with two and three wings; the slotted heads will receive any kind of cutter, without regard to the position of the slots. The gaining and grooving heads are usually made of gun metal or steel, perfectly finished, accurately balanced, and provided with steel set screws.

In addition to the usual number of heads that accompany each of our machines, we have, as will be seen below, a large assortment of heads suitable for almost every variety of work.

We keep a stock of these heads constantly on hand, and are prepared to furnish them at short notice, also sash, slat, door, and planing cutter, and any style of molding cutters. Parties who have our new molding book need only to designate the numbers wanted; if they have no book, send for one, or forward tracing of the moldings wanted, and state the number and size machine they are wanted to be used upon.

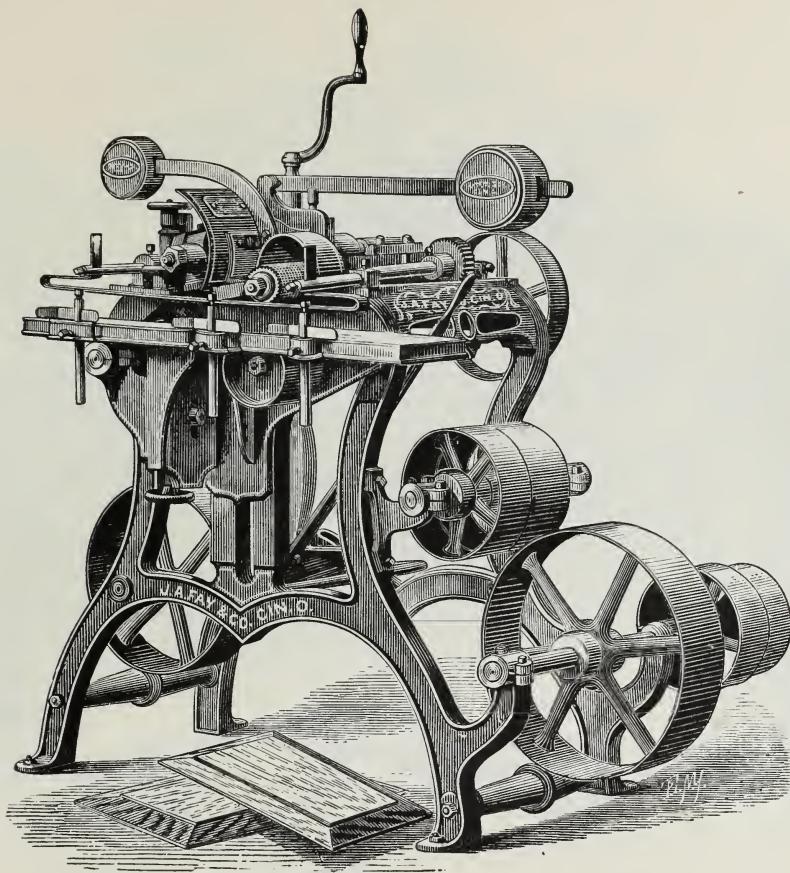
LIST OF EXTRA HEADS FOR

Nos. 1 and 2 Molding and Sash Machines.

Panel.	Head.
2 1/8 in. sash	"
2 3/8 in. door	"
2 3/8 in. slat	"
2 1/2 in. molding	"
3 in. molding	"
2 3/4 in. side planing	"
4 in. planing	"
8 in. planing	"
8 in. combination	"

Nos. 3 and 4 Molding Machines.

Panel.	Head.
2 1/4 in. sash	"
2 1/2 in. door	"
2 1/2 in. slat	"
2 1/2 in. molding	"
3 in. molding	"
3 1/2 in. molding	"
4 1/2 in. molding	"
6 in. molding	"
4 in. combination	"
8 in. combination	"



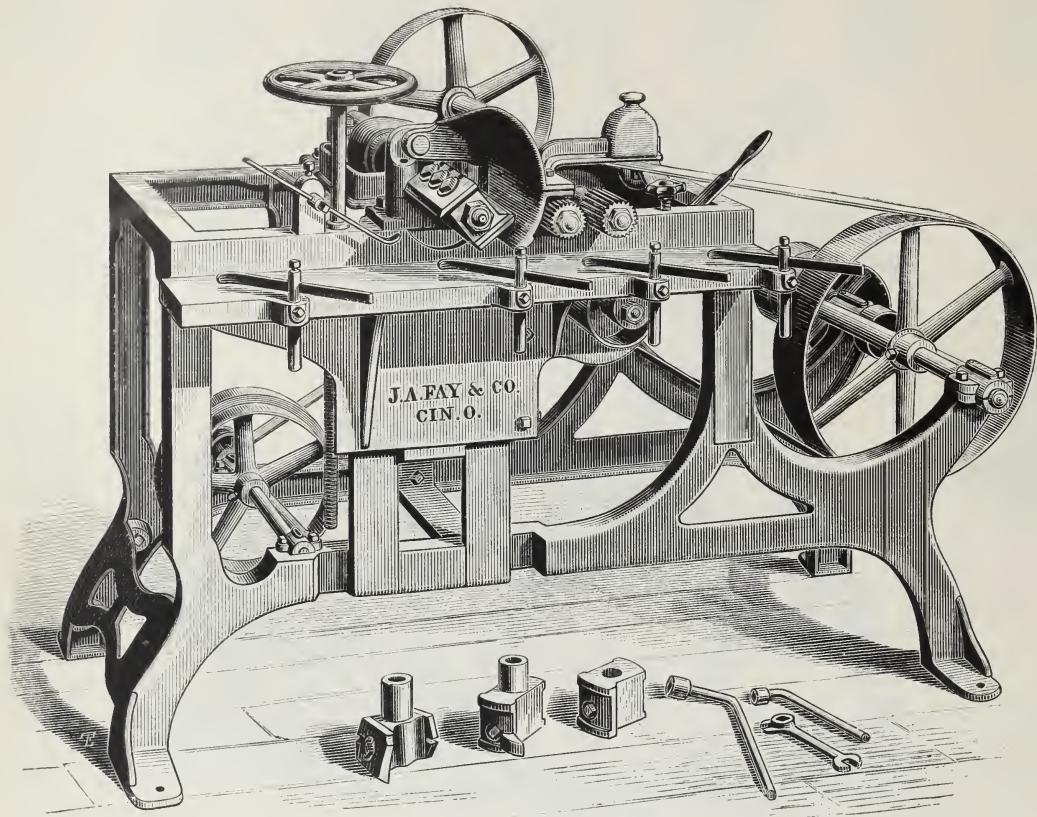
Double Panel Raising Machine.

Raising or molding panels is an important operation in sash and door manufacture, and a machine is desirable which can be adapted to other uses when required, such as sticking sash, planing blind slats, trunk strips, etc. The above machine will raise a panel on both sides, at one operation, of any style of molding, O. G. bevel, etc., and any width up to two and one-half inches.

It is provided with heavy cast steel arbors running in self-oiling bearings, has a wide table to support the stuff, and two cutter heads, one above the table and the other situated in and adjustable with the surface of the table, readily accessible by swinging the end of the table outwardly on a hinge. The cutters on the heads are set at an angle, to produce a drawing cut and finish the surface perfectly smooth, on hard or soft wood; and have no corners to wear away, to the destruction of the entire bit.

There are two weighted feed rollers, and a friction roller in the table, with the necessary springs and pressure bars, to retain the stuff in its place. The arbors run in self-oiling boxes, all parts are well fitted, easy of adjustment, and have every convenience for performing the work in the most satisfactory manner.

Any width of raise above two and one-half inches and up to five inches is made by substituting other heads. By removing the long hold down spring and substituting other heads and cutters, it may be utilized and used at good advantage in sticking of all kinds of sash moldings, etc. It is supplied with the patent tight and loose pulleys, which are eight inches in diameter and four-inch face, and should make 800 revolutions per minute.



NO. 1

Sash and Molding Machine.

This machine is designed for use where one side is to be worked at a time, and is adapted for all kinds of sash, doors, blind slats, trunks, strips, etc. The arbor is large, and runs in self-oiling bearings. The cutter head will plane up to six inches in width. The arbor frame has a lateral movement for accurate adjustment in sticking sash and moldings. The table will drop fourteen inches for grooving door rails, etc, and is raised and lowered by the hand wheel in front.

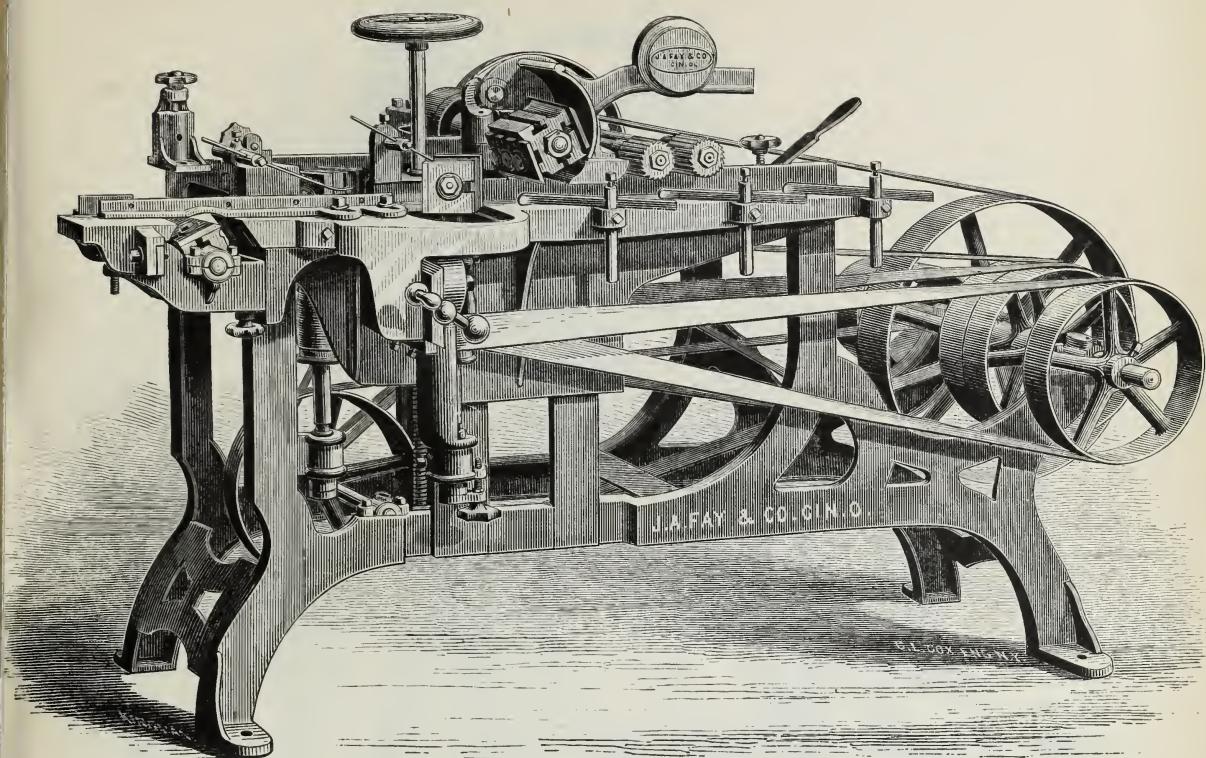
It has two feeding rolls of large diameter and made in sections, strongly geared, and has changes of feed for light and heavy work.

It has the combined bonnet and pressure bar, so arranged that they can be swung out of the way, or moved to and from the cutters to accommodate the work being done.

The machine is complete with one head, which can be either a planing, rabbeting, sash, or molding head, as parties may indicate.

Any of the heads shown on pages 68 and 69 of this catalogue can be furnished for the working of any kind of sash, blind slats, etc.

The tight and loose pulleys are eight inches in diameter, and four-inch face, and should make 875 revolutions per minute.



NO. 2

Patent Molding and Sash Machine.

(TO WORK THREE AND FOUR SIDES.)

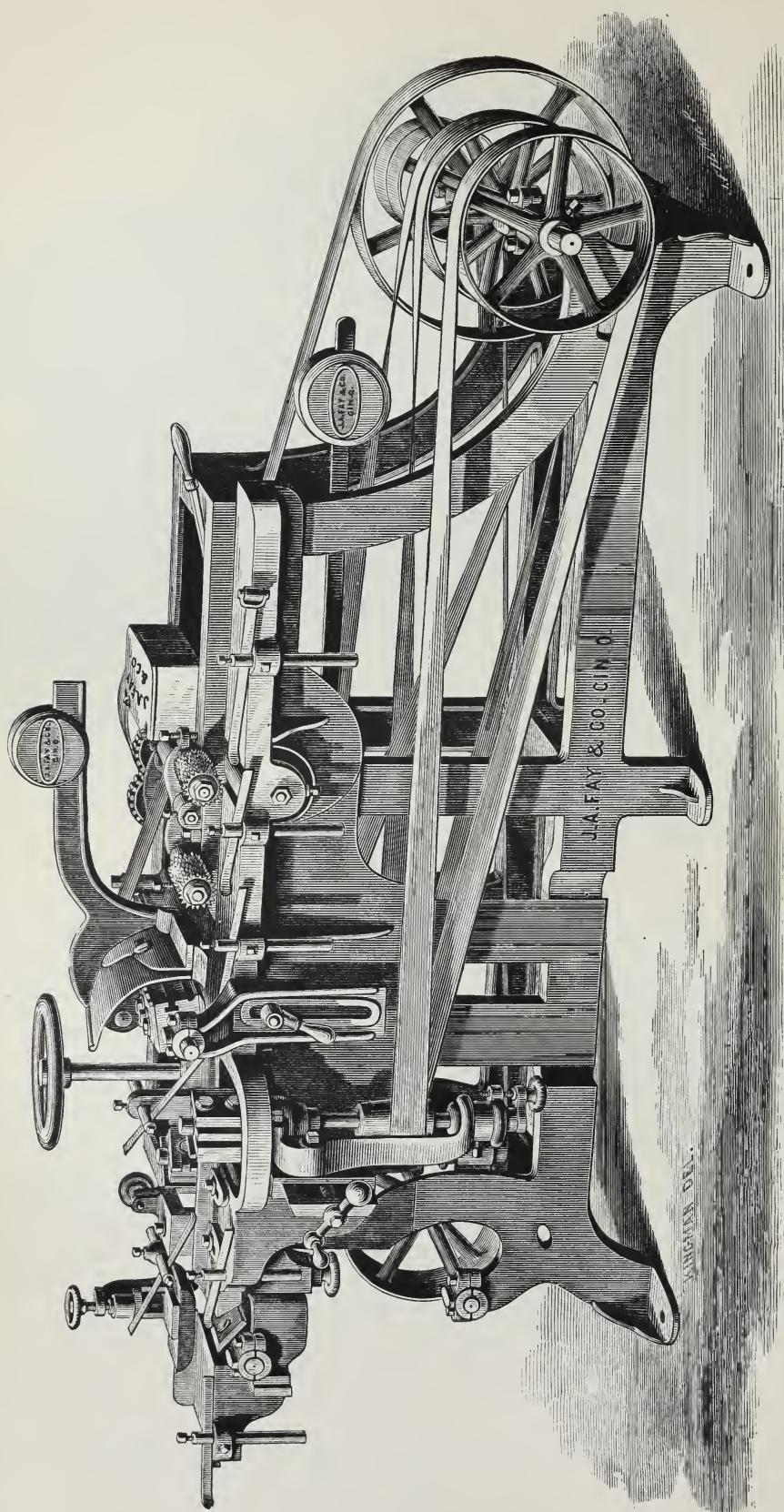
This is an effective and heavy machine for light moldings, sash, door, and blind work, or narrow flooring. It is substantial in construction, and all parts easy of access. It is made to work six or eight inches wide, and on either three or four sides, as may be wanted. The cutter-head is of steel, slotted on all four sides. The main arbor runs in patent self-oiling boxes, provided with a lateral adjustment for accurate work on moldings.

The side heads are of steel and slotted, and revolve on steel arbors, which have a lateral adjustment sufficient to take in stuff up to six inches wide. Both side spindles have vertical adjustment, and the outside spindle can be swung to an angle.

The under head is provided with an adjustable throat, and can be quickly adjusted to the thickness of the cut. The bonnet and attached pressure bar can be instantly thrown back clear of the upper head. It has two feeding rolls of large diameter, two changes of speed, and strongly geared, and their motion is instantly started or stopped by means of a lever placed in the most convenient position for the operator.

The table or platen has a vertical movement of fourteen inches. The pulleys are of large diameter; all bearings provided with devices for retaining the oil in contact with the journals, and the entire machine fitted together so as to give it great strength. Heads and cutters for molding the edges of blind slats, or for working sash and panels, can be furnished as extra when desired; also, any of the heads and cutters illustrated on pages 68 and 69. It is provided with all the necessary guides, springs, wrenches, etc.

It has the patent tight and loose pulleys, which are eight inches in diameter, four-inch face, and should make 875 revolutions per minute.



NO. 3 FOUR SIDE
Medium Size Patent Molding Machine.

(WITH SLOTTED STEEL CYLINDERS.)

NO. 3

Medium Size Patent Molding Machine.

This machine is designed for doing all kinds of work in a general jobbing shop, and will be found invaluable to house carpenters, sash, blind, and door, car and agricultural implement makers, and will pay for itself in a very short time over hand labor.

It is constructed with very heavy and substantial framing, and is capable of working moldings up to eight inches wide. The feeding rolls are arranged to raise parallel with the stuff being worked, and so weighted from below as to secure a uniform pressure upon it at all times. By lifting the weighting lever the operator can instantly withdraw the stuff before it reaches the cutter head. A very complete tool box is affixed to the roller cranes.

The main arbor is of large diameter, revolves in self-oiling bearings, is fitted with a steel head slotted on all four sides, and an adjustable outside bearing, which prevents vibration on heavy work, also a lateral adjustment for accurate work on moldings.

The under head is also made of steel and slotted, and revolves between adjustable nose pieces, which can be set so as to enlarge or decrease the opening in the table. An adjustable pressure plate is arranged over the under head, and the knives when once set can be instantly adjusted to suit different kinds of planing. The side spindles are of steel, run in self-oiling boxes, are fitted with slotted steel heads, and have vertical adjustment to suit the work being done. The outside spindle can be adjusted to varying angles.

The weighted shaving bonnet and attached pressure shoe can be instantly swung around clear of the bed, giving the operator ready access to the knives. The bed or platen has a friction roll, and will lower to take in stuff up to fourteen inches.

The under cylinder can be quickly detached, or the end swung out so as to easily reach the cutters, and can be instantly adjusted, to give more or less cut while in motion. With each machine is furnished one head, and one set of straight cutters to each arbor. We can also furnish as extra, if wanted, the heads and cutters for working sash, moldings, panels, blinds, doors, viz. :



2 3/8 Slat.



2 3/8 Door.



2 1/2 Sash.



3 1/2 Molding.



2 Wing Matcher.



6 in. Molding.

or any work suitable to be done on machines of this character, also matcher heads and cutters for working flooring, or any of the heads described on page 68, this catalogue.

Full sets of heads, springs, and wrenches, countershaft and pulleys fitted for wide belts are sent with each machine. They are made to work either three or four sides, as customers may desire, and are most carefully and thoroughly fitted in every part.

The patent tight and loose pulleys are furnished with this machine; they are eight inches in diameter and four-inch face, and should make 875 revolutions per minute.

NO. 3½

New Heavy Triple Roll Molding Machine.

(TO WORK THREE OR FOUR SIDES.)



NO. 3½

New Heavy Triple Roll Molding Machine.

This is a very strong machine, designed for light or heavy work in sash and door molding, or for any general manufacturing business of the same character. The frame of the machine is in two parts, each cast solidly with the girts and sides in one continuous piece. This gives it great strength and prevents any liability of twisting.

The capacity of this machine is to eight or nine inches in width. The side head will dress to four inches in thickness, and the bed may be lowered fourteen inches. It is arranged to work three or four sides at one operation, as may be desired.

The feeding arrangement consists of three large and heavily weighted grooved rollers driven by heavy gearing with two speeds of feed, and shipped into or out of gear by a clutch operated by a lever. The rollers can also be lifted from the lumber when it is desirable not to feed it further.

The cutter heads are made of cast steel and slotted on all four sides. The upper head is placed on a heavy steel spindle which runs in self-oiling bearings, constructed so as to constantly flood the journal with oil, the connecting frame with which they are cast, being gibbed to the frame of the machine and adjustable across it by means of a screw and hand wheel.

The side heads both move vertically with the bed, and are adjustable to the face of it. The outer head can be moved to and from the frame, or quickly set at different angles.

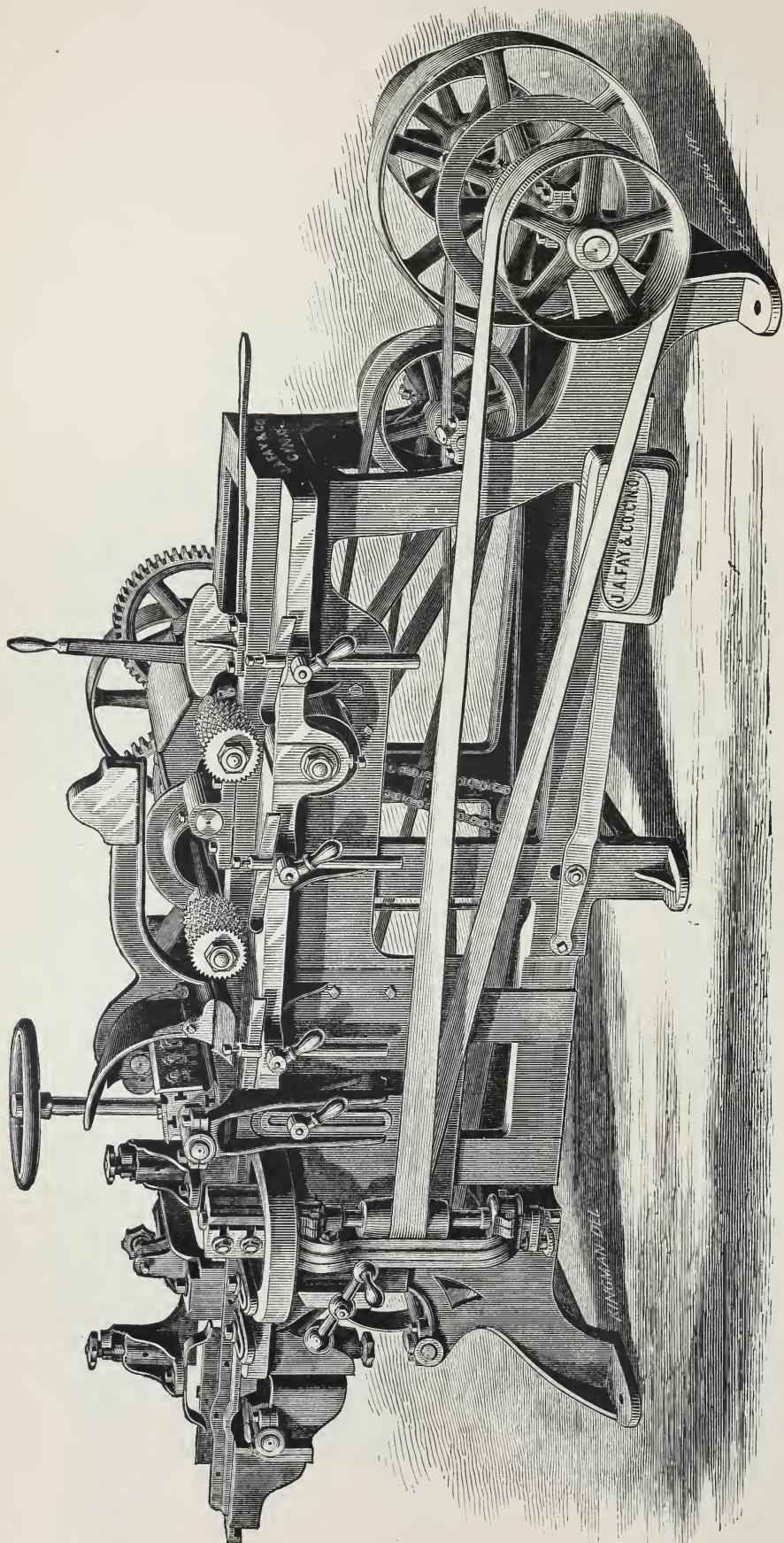
The lower head has the necessary adjustment for thickness of cut and access to the head, and a pressure bar for holding down the lumber.

The bonnet is arranged for taking in the largest cutters, and swings so that it will not lift into them.

It can be moved to and from the cutter head, and swung out of the way over the machine for setting the cutters. The bed is raised or lowered by a single screw, and locked position.

The machine is very long, allowing great lengths of belts. The pulleys are all of large diameter, which ensures great power in the cut. There is a friction roller in the bed, and the necessary springs, wrenches, etc., are furnished with the machine.

It has the patent tight and loose pulleys which are ten inches in diameter and six-inch face, and should make 1,000 revolutions per minute.



NO. 4
Large Size Patent Molding Machine.

(TO WORK THREE AND FOUR SIDES.)

NO .4

Large Size Patent Molding Machine.

(TO WORK THREE AND FOUR SIDES.)

The above engraving represents a large, heavy, and powerful machine, designed for working moldings up to eight and ten inches wide. It is constructed in the most thorough manner, and combines important improvements our long experience in building this class of machinery has found necessary, in order to produce the most perfect work at the highest attainable speed.

As more than eighty per cent. of the work done on machines of this character are moldings less than five inches wide, the value of a first-class machine will at once be apparent.

The same care is used in the construction of this as all other of J. A. Fay & Co.'s machines. All shafts and turned fittings are finished to standard sizes, screws turned, heads and threads made to a regular system, holes bored and tapped to exactly correspond, and all parts balanced with the utmost care; journal bearings reamed and scraped, the very best materials used, and every part fully inspected and tested before leaving the works.

The main spindle is of large diameter, run in long, patented, self-lubricating bearings, lined with the best lining material, and is constructed so as to flood the arbor constantly with oil. Some of its distinguishing features are, viz. :

1st. The machine is fitted with top, bottom, and side cutters which work simultaneously on all four sides at once, enabling them to work single or double moldings, or to plane, rabbet, groove or tongue and bead at one operation, with a capacity of fifteen to thirty feet per minute.

2d. The main spindle is of large diameter, with provision to take up any end play by wear, and the gateway is gibbed to the frame, so it can be laterally adjusted without unloosening bolts; all the cutter heads are made of steel and slotted to receive cutters on all four sides.

3rd. Both side spindles have vertical and lateral adjustments. The outside spindle is arranged to work at varying angles.

4th. The under cylinder has a vertical movement independent of the bed, enabling the operator to vary the cut without altering the cutters; and the cutter heads are made of steel, slotted on all four sides so that any form of cutter may be used.

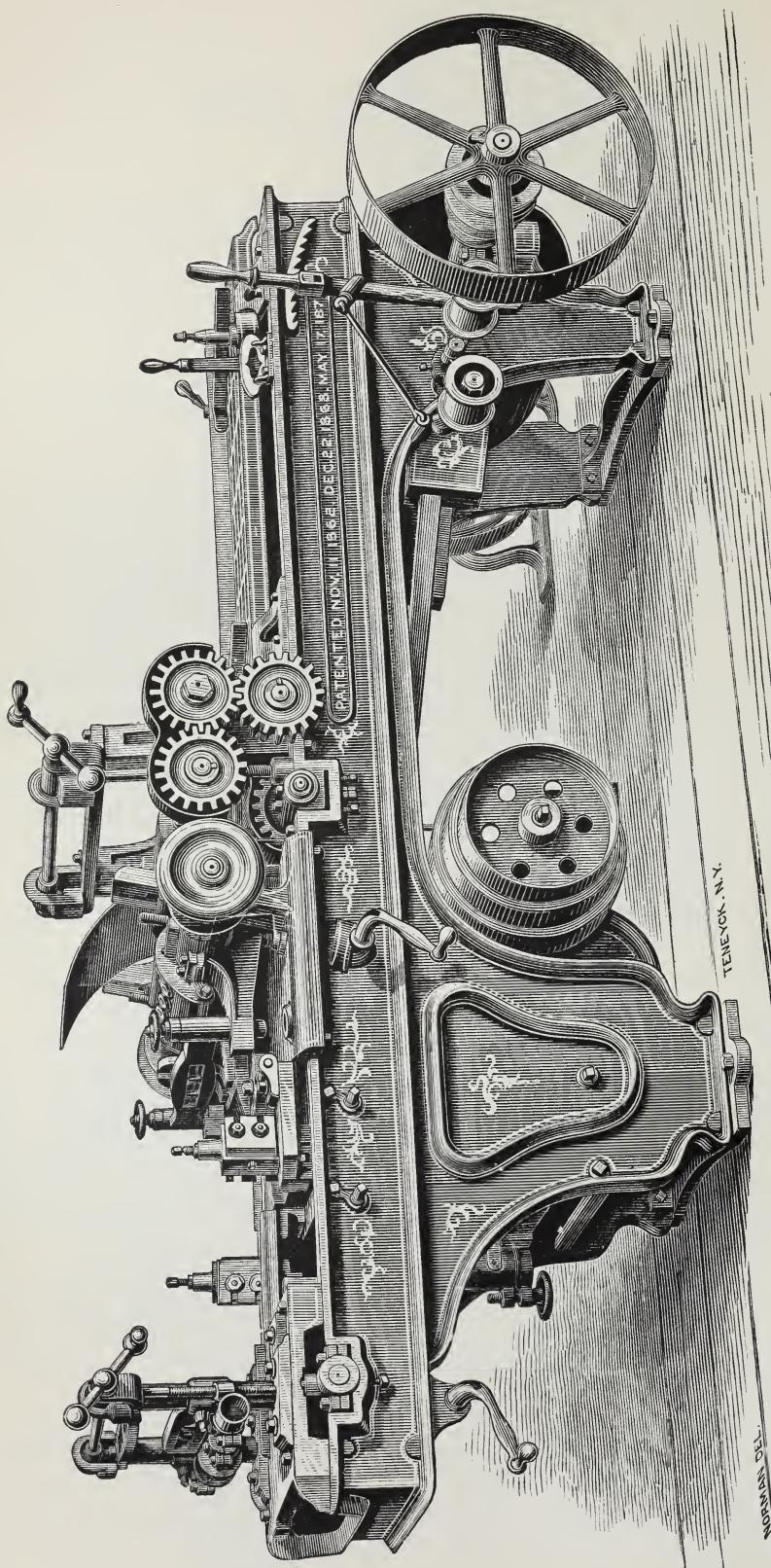
5th. It has our weighted shaving bonnet and pressure shoe, which can be swung clear of the bed, giving ready access to the cutters.

6th. The feed rolls are of large diameter, raise parallel to the stuff being worked, and so weighted as to secure uniform pressure at all times; they are hung in swinging cranes, and by means of a lever at the rear of the machine are instantly elevated from the stuff when it is desired to withdraw it before reaching the cutters.

7th. The lower roll in the platen is also a driven roll, and the bed will drop to take in thirteen inches, and every part including cutter head, arbors, etc., is easily accessible.

It has two changes of feed, full set of pressure bars, springs, wrenches, etc., and will be found unequalled in its ability to produce good work. Matcher heads and cutters are furnished, when wanted for flooring; also extra heads and profile cutters for any style of molding.

It is supplied with our patent tight and loose pulleys, which are ten inches in diameter and six-inch face, and should make 1,000 revolutions per minute.



NO. 1 TWO ROLL

Inside Patent Molding and Beading Machine.

(TO WORK FOUR SIDES AND BEAD.)

NO. 1 TWO ROLL

Inside Patent Molding and Beading Machine.

(TO WORK FOUR SIDES AND BEAD.)

This is a substantial, well built machine; will work moldings on one or both sides twelve inches wide and under, and up to five inches in thickness; also, plane, tongue, groove, and bead twelve inches wide.

The cylinders are made from solid cast steel, belted on each side, and run in large patent self-oiling bearings, slotted on each face, enabling the cutters to be set at varying angles and capable of sticking any size of molding, by using cutters on all four sides, thus equalizing the cut and utilizing the power.

The under cylinder has a vertical adjustment, graduated to different thicknesses of cut while in motion, and by simply loosening one bolt the pressure bar and stands can be swung entirely clear of the cylinder, giving free access to the cutters for purposes of sharpening or adjusting.

The patent beading attachment is placed upon the pressure bar, over the under cylinder, so as to gauge the depth of the bead from the surface of the board, thus securing an automatic adjustment of the beading shaft at all times.

The upright spindles can be moved vertically or horizontally while in motion, the outer spindle to any angle desired, and is provided with our patent self-oiling bearings and patent steps.

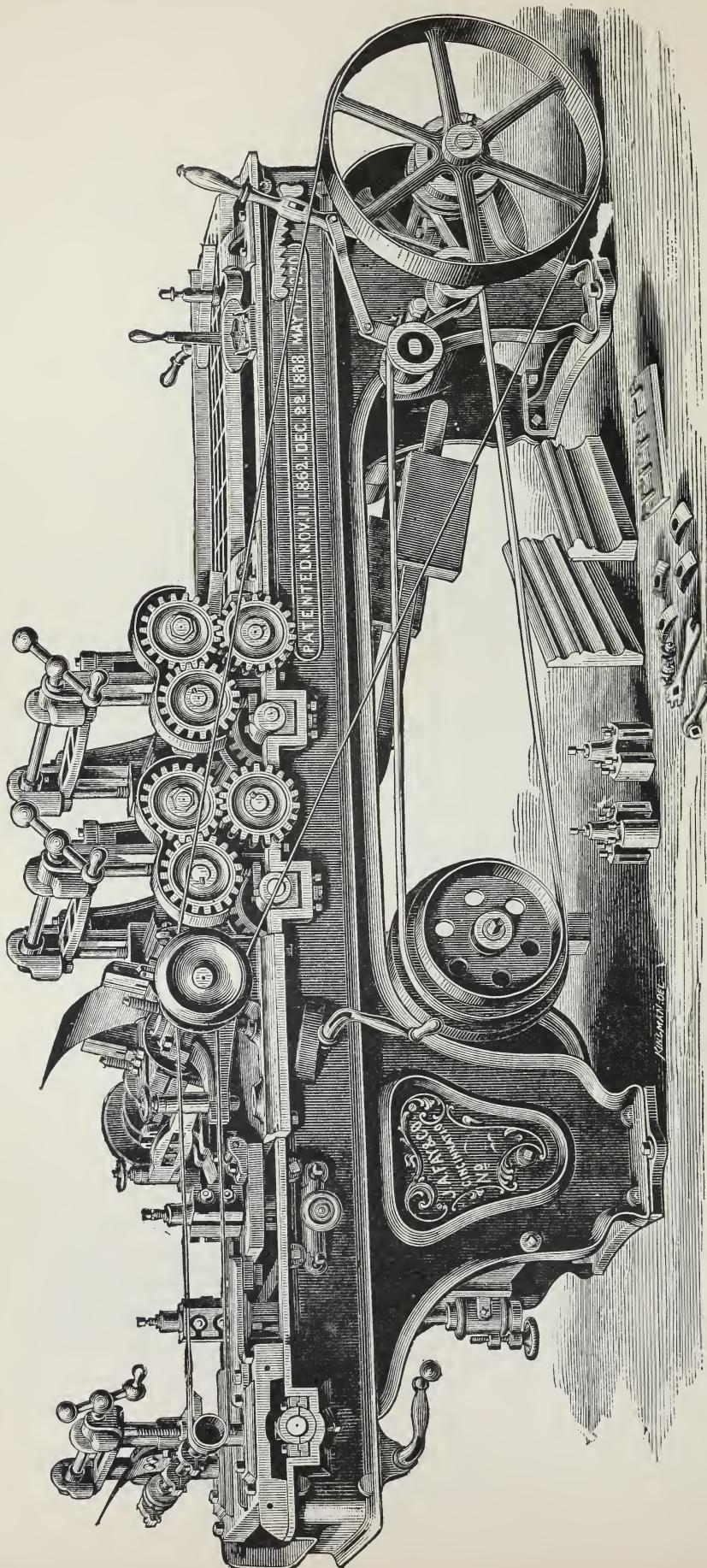
The side heads are made of steel, and the arbors have a lateral adjustment on separate platens, and are provided with lock attachment for preventing the possibility of movement after the heads are brought to the desired position; also the patent chip breaker for holding the fibre of the wood while the side cuts are being made.

It has two feeding rolls of large diameter, the upper one made in sections fitted with our patent weighting attachment and pivoted boxes, which secures an equal pressure on the lumber being worked, regardless of any inequalities in the thickness.

The rolls are connected by patented expansion gearing of superior construction, which allows the upper roll to adapt itself to the varying angles on irregularly sawed lumber. We can furnish matcher heads and cutters for working flooring, when desired.

The stuff being worked may be quickly withdrawn from the machine by elevating the feed rolls, by means of a lever placed in convenient reach of the operator. It has changes of feed, improved belt tightener, and fully provided with pressure bars, guides, wrought iron moulding caps for the heads, steel wrenches, etc. All the adjustments are made with the greatest facility, and nothing has been omitted that would enhance the efficiency of the machine.

It is supplied with the patent tight and loose pulleys, which are twelve inches in diameter and six-inch face, and should make 600 revolutions per minute.



NO. 2 FOUR ROLL

Large Inside Patent Molding and Ceiling Machine.

(TO WORK FOUR SIDES AND BEAD.)

NO. 2 FOUR ROLL

Large Inside Patent Molding and Ceiling Machine.



(TO WORK FOUR SIDES AND BEAD.)

This machine is larger than that described on the preceding pages, and embraces new and important labor-saving features, thereby increasing the capacity for the production of any size or style of molding, from the smallest to the largest, with the greatest accuracy and rapidity.

It will work moldings on one or both sides, twelve inches wide and under, and up to five inches in thickness, also plane, tongue, groove, and bead twelve inches wide.

The cylinders are made from forged cast steel, belted on each side, and run in large patent self-oiling bearings, are slotted on each face, enabling the cutters to be set at varying angles and capable of sticking any style of molding, by using cutters on all four sides, thus equalizing the cut and utilizing the power.

The upper cylinder has a special arrangement for securing a lateral adjustment across the bed for accurate work on fine moldings; has movable pressure bars each side of the cut, and the bed is provided with recesses for the projection of cutters below the surface.

The under cylinder has a vertical adjustment, graduated to different thicknesses of cut while in motion, and adjustable nose pieces for closing the gap over the cutters for fine work; by simply loosening one bolt the pressure bar stands can be swung entirely clear of the cylinder, giving free access to the cutters, for purposes of sharpening or adjusting.

The patent beading attachment is placed upon the pressure bar, over the under cylinder, so as to gauge the depth of the bead from the surface of the board, thus securing an automatic adjustment of the beading shaft at all times.

The upright spindles can be moved vertically or horizontally while in motion, the outer spindle to any angle desired, and are provided with our patent self-oiling bearings and patent steps.

The side heads are made of steel, and have a lateral adjustment on separate platens, and provided with lock attachment, for preventing the possibility of movement after the heads are brought to the desired position, also, the patent chip breaker for holding the fibre of the wood while the side cuts are being made.

It has four feeding rolls of large diameter, the upper one made in sections fitted with our patent weighting attachment and pivoted boxes, which secures an equal pressure on the lumber being worked, regardless of any inequalities in the thickness.

The rolls are connected by patented expansion gearing, of superior construction, which allows the upper roll to adapt itself to the varying angles on irregularly sawed lumber. We can furnish matcher heads and cutters extra, when wanted; with this addition it makes a first-class machine for ceiling and flooring, working all four sides at once.

The stuff being worked can be quickly withdrawn from the machine by elevating the feed rolls, by means of a lever placed in convenient reach of the operator. It has changes of feed, improved belt tightener, and fully provided with pressure bars, guides, wrought iron molding caps, for the heads, steel wrenches, etc. All the adjustments are made with the greatest facility, and nothing has been omitted that would enhance the efficiency of the machine.

The patent tight and loose pulleys are furnished with this machine; they are twelve inches in diameter and six-inch face, and should make 600 revolutions per minute.

J. A. Fay & Co.'s Patent Universal Wood Worker.

The Universal Wood Worker is acknowledged by all to be one of the most important labor-saving machines in the entire list of wood-cutting machinery. Since the issue of our last general catalogue, we have become half owners of the Climer & Riley Universal Wood-Worker Patent, as will be seen below, and have made important improvements, largely increasing its value and capacity over the old style of machines, which we have secured by letters patent, and are found only on our machines. We take pleasure in announcing to the public this important addition to our already extensive list of wood-working tools.

SPECIAL NOTICE OF SALE.

This is to certify, "That I have this 8th day of January, 1876, sold and conveyed to J. A. Fay & Co., one undivided half-interest in the Patent No. 59,966, dated November 27, 1866, granted to Henry Climer and John D. Riley for improvements in Planing Machines known as the Universal Wood Worker, and with it all the right of the Estate of said John D. Riley, deceased, to use such name in making and selling machines. J. B. MANNIX, Admin.

The molder and wood-worker sides are securely connected upon one solid column with a substantial base, covering sufficient floor surface to insure perfect stability. The arbors are all made of steel, are of large diameter, and run in long self-oiling bearings.

The two sides of the machine are driven from a countershaft, arranged to convey the power to both sides simultaneously or separately, as the operator may desire. This method of obtaining independence of the combination allows two operators to perform their work on either side without either interfering with the other, and either side may be started or stopped without affecting the other—a most valuable feature.

We claim for the J. A. Fay Co. Patent Universal Wood Worker, that it is:

Unrivalled in the range and variety of work for which it is adapted.

Unequalled in readiness of adjustment, as it has less parts to adjust.

Superior in the ease with which the work is performed, and the

Only wood worker made where both sides may be operated upon, and either side started or stopped without interfering with the other.

The most substantial and powerful universal wood worker made.

A greater labor-saver than any other of its class.

Unsurpassed in its economy of shop room.

Perfect in the arrangement of the arbors and working parts.

Provided on the molding side, as no other wood worker is, with all the adjustments necessary to produce perfect moldings, etc., etc.

As a planer it is adapted for ordinary surfacing and thicknessing, planing out of wind, surfacing square, beveling or tapering pieces, facing up newels, balusters, etc.

As a molding machine it will work moldings, either simple or complex, in the most perfect manner, up to eight inches in width; has all the adjustments of our regular molding machine, will stick sash and doors, tongue and groove, and on the wood worker side will work waved, oval, elliptical, circular, and serpentine molding, etc.

Among the other uses to which the machine can be applied we may mention: planing out of wind, surfacing straight or tapering work, rabbeting door frames, etc.; rabbeting and facing inside blinds, jointing, beveling, chamfering, plowing, making glue joints, squaring up bed-posts table legs, newels, etc.; raising panels either square, bevel, or ogee, sticking beads, working circular molding, ripping, cross-cutting, tenoning, etc., as shown on pages 97 to 102 and a variety of other operations limited only by the skill and ingenuity of the operator.

The molding side is so arranged as to form a complete and perfect molder. The heads are made of steel and slotted on their four faces. The spindles are also of steel; the upper spindle having an outside bearing to prevent vibration in heavy cutting.

The side spindles are fixed to and move with the table, have self-oiling steps, and vertical, horizontal, and angular adjustments. The bed will drop twelve inches. The feeding rolls are of large diameter, powerfully geared, heavily weighted, and arranged for fast or slow feed.

The end of the bed can be swung entirely clear of the under cylinder, thus giving ready access to the knives for purposes of adjustment. The under cylinder has vertical adjustment to obtain desired thickness of cut, and adjustable throats for bringing the table close to the cut of the head, or enlarging the opening for heavier cuts on the lower side, and also for working blind slats or springing moldings from the bottom side.

The Wood-Worker side is constructed with iron platens, planed perfectly true and have independent vertical and lateral adjustments, quickly made by the operator. When facing or planing out of wind, the vertical and lateral adjustments can be made simultaneously, thus constantly retaining the proper distance between periphery of cut and the edge of table.

All the different functions of the machine are secured by the use of two tables, while other machines of this kind have three tables, thereby saving time in making adjustments. The tables are made with grooves to receive the gaining frame, and are made continuous by filling pieces connecting the two tables at each side.

The arbor is of steel, of large diameter, and revolves in bearings supported on the column. One bearing is cast solidly to the column, and the other is movable, being placed in a seat, the height of which to the center of the arbor is equal to one-half the diameter of the largest head to be used. The movable or outside bearing is instantly detached for the purpose of substituting different heads. This is a very important and advantageous feature, as it gives greater stability to the arbor and obviating its liability to spring, renders the machine capable of performing a larger range of work.

The adjustable fence and bevel rest is fastened to the front table, and is quickly adjustable to different angles, and can be moved crosswise to any part of the table. It serves as a guide for the greatest part of the work done on the machine, and being attached to and forming a part of the forward table always maintains its proper position in relation to the knives.

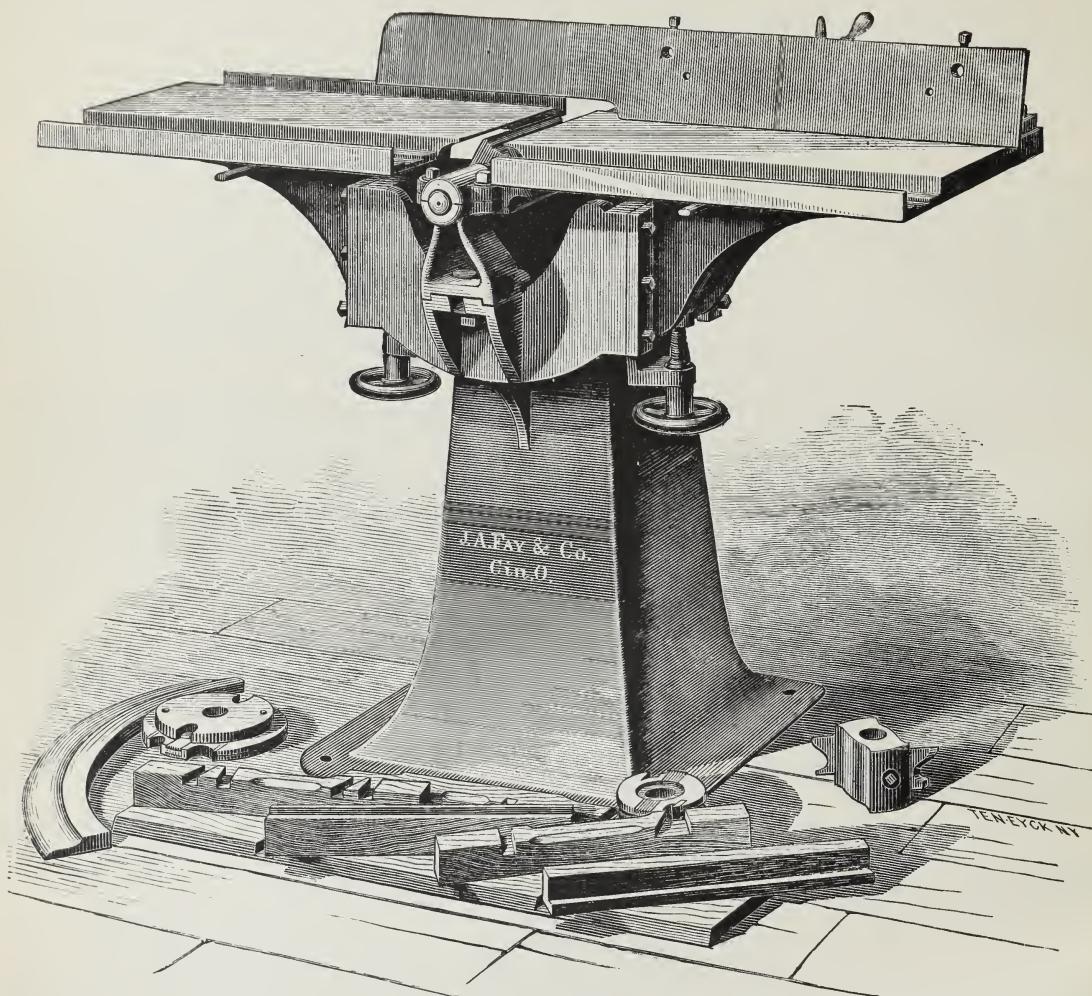
The gaining frame is used for guiding the stuff when passing over the gaining head. It traverses in the recesses in the front of the tables, requires no bolting to the machine, and is readily adjustable for making either a straight or angular cut.

The saw frame fits in between the two tables and forms a continuous saw table. It is provided to receive rip or cross-cut saws, and can be attached in two minutes' time.

Each machine is provided with an eight-inch three-knife planing head, rabbeting, jointing, and capped heads, and is fitted to receive our expansion gaining and paneling heads, and, when desired, can be fitted on opposite sides with boring and routing table, which has vertical and lateral adjustments to suit the size of the stuff being worked.

We furnish as extra when desired: solid and expansion groover-heads, panel raising heads, rabbetting heads, jointing heads, capped molding heads, or heads and fixtures for any special work the machine may be desired to do.

In the following pages will be found diagrams and instructions, which will enable the intelligent operator to fully understand its scope and method of operation.



NO. 1

Solid Frame Patent Variety Wood Worker.

WITH ADJUSTABLE FENCE AND BEVEL REST, VERTICAL AND LATERAL ADJUSTMENT OF TABLES,
OUTSIDE BEARING, SELF-OILING JOURNAL BOXES, ETC.

NO. 1

Solid Frame Patent Variety Wood Worker.

This is a most valuable labor-saving machine for carpenters, builders, sash and door shops, pattern makers, wagon shops, etc., and, in fact, will be found of great use and benefit to the intelligent operator in almost every wood-working shop for planing out of wind, planing straight or tapering work, rabbeting door frames, etc., rabbeting and facing inside blinds, jointing, beveling, gaining, chamfering, plowing, making glue joints, squaring up bed posts, table legs, newels, etc., raising panels either square, bevel, or O. G., sticking beads, working circular molding, ripping, cross cutting, tenoning, etc., etc.

In the range and variety of work for which it is adapted, readiness of adjustment, the ease with which it is operated and kept in order, the accuracy and rapidity with which the work is performed, economy of shop room, and in durability of construction and labor-saving qualities it is unequaled.

It is constructed with a substantial cored column, so arranged that it can be belted either from above or below, and is provided with a cast steel arbor of large diameter, running in self-oiling boxes, which has a detachable outside bearing. By simply loosening a bolt at the bottom of this outside bearing, it can be instantly removed for the purpose of substituting different heads for the various kinds of work, and as rapidly adjusted to place again.

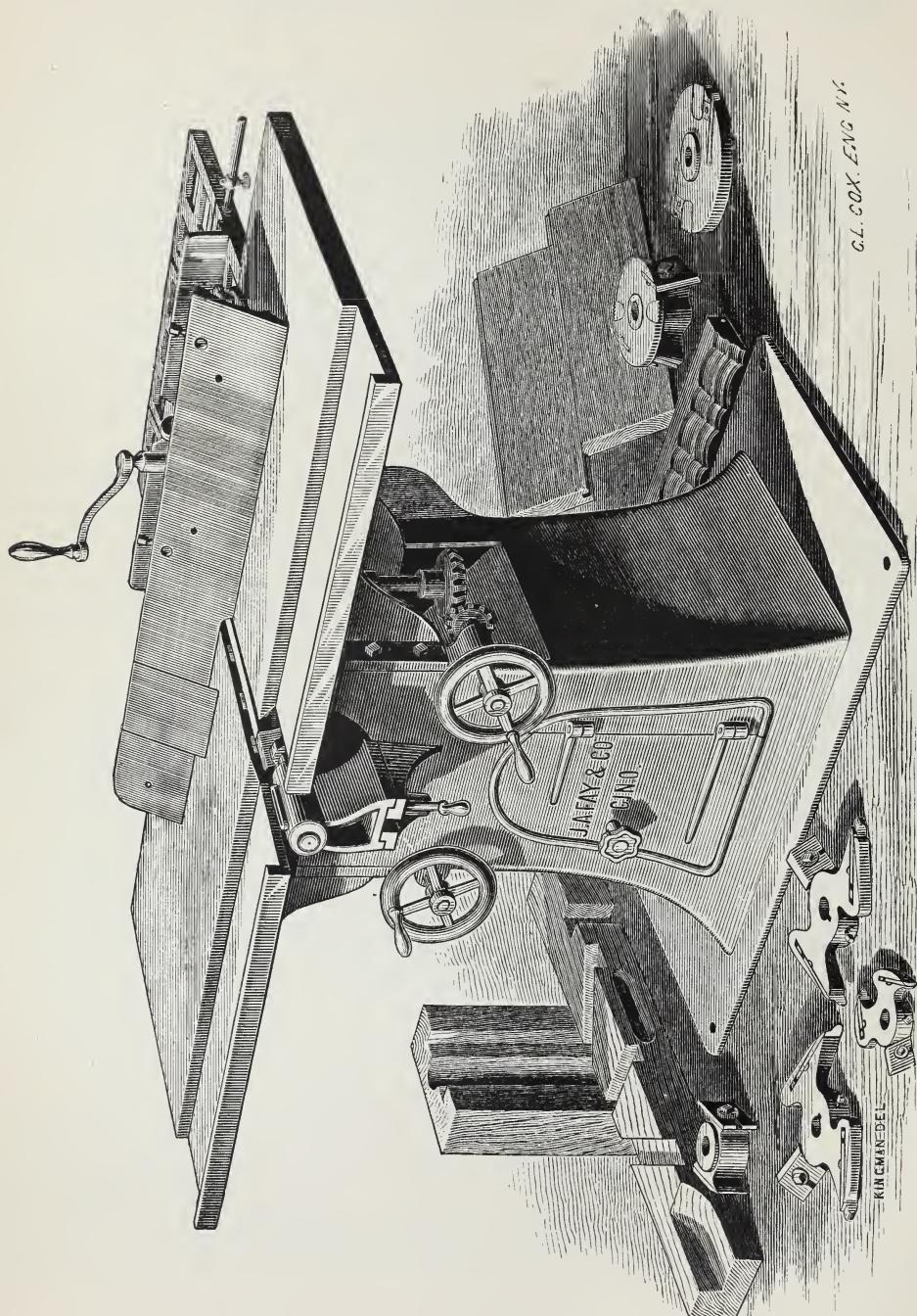
This important advantage will be readily manifest, as the arbor, having an outside bearing support runs without vibration, and is not liable to spring, thus rendering the machine capable of performing a larger range of work. The heads are as quickly changed on this machine as on those where the head overhangs the bearing, while it is rendered more certain and steady in its operation.

The tables are made of iron, planed perfectly true, have independent vertical and lateral adjustments to adapt them to the work being performed, and are so arranged that for facing or planing out of wind these adjustments are made simultaneously, thus constantly retaining the proper distance between the periphery of cut and edge of table. Machines constructed by other builders require three tables to be adjusted, while in the Patent Variety Wood Worker all the functions are secured with two, thus affecting a saving of time to the operator in adjusting his machine to do various kinds of work.

Another very important advantage will be found in the fence, which requires no separate adjustment; being attached to and forming a part of the forward table it always maintains its proper position in relation to the cutters. It has a lateral adjustment, is fitted to receive pressure springs for holding down the stuff, and swings to different angles for beveling work. For sawing, a table is inserted between the other two, making a solid and continuous saw table.

When desired, we furnish upon the rear side a boring and routing table for all common boring and routing. A complete dovetailing attachment can also be fitted to the machine, and is a valuable addition to its already numerous functions. With each machine is furnished one eight-inch three knife planing, one rabbeting, one jointing, and one capped molding head, adjustable fence and bevel rest.

The cylinder pulley is three and one-half inches in diameter, five-inch face, and should make 3,600 revolutions per minute.



NO. 2

Solid Frame Patent Variety Wood Worker.

(WITH ADJUSTABLE FENCE AND BEVEL REST, VERTICAL AND LATERAL ADJUSTMENT OF TABLES,
OUTSIDE BEARING, SELF-OILING JOURNAL BOXES, ETC.)

NO. 2

Solid Frame Patent Variety Wood Worker.

This is a somewhat larger and heavier than our No. 1 machine, and is thoroughly adapted for the heaviest range of work. It is constructed on a firm and substantial column cast in one solid piece of convenient height for the operator, and is a most valuable labor saving tool for carpenters, builders, sash and door shops, pattern makers, wagon, carriage, and furniture manufactories, etc., as it will perform a great variety of work which would otherwise require hand labor or the use of several machines.

It will plane out of wind, surface straight or tapering, rabbet door frames, etc., rabbet and face inside blinds, joint, bevel, gain, chamfer, plow, make glue joints, square up bed posts, table legs, newels, etc., raise panels either square, bevel, or ogee, stick beads, work circular molding, rip, cross-cut, tenon, dovetail, etc., as shown by accompanying diagrams.

The iron platens are planed perfectly true and have independent vertical and lateral adjustments. The vertical adjustment is quickly made by means of hand wheels, placed in the most convenient position for the operator. When facing or planing out of wind, the vertical and lateral adjustments can be made simultaneously, thus constantly retaining the proper distance between periphery of cut and edge of table.

All of the different functions of the machine are secured by the use of two tables, while other machines of this kind have three tables, thereby effecting a saving of time in making adjustments. The tables or platens are made with grooves to receive the gaining frame, and are made continuous by filling pieces connecting the two tables. For sawing, an extra table can be inserted between the other two, making a solid and continuous saw table.

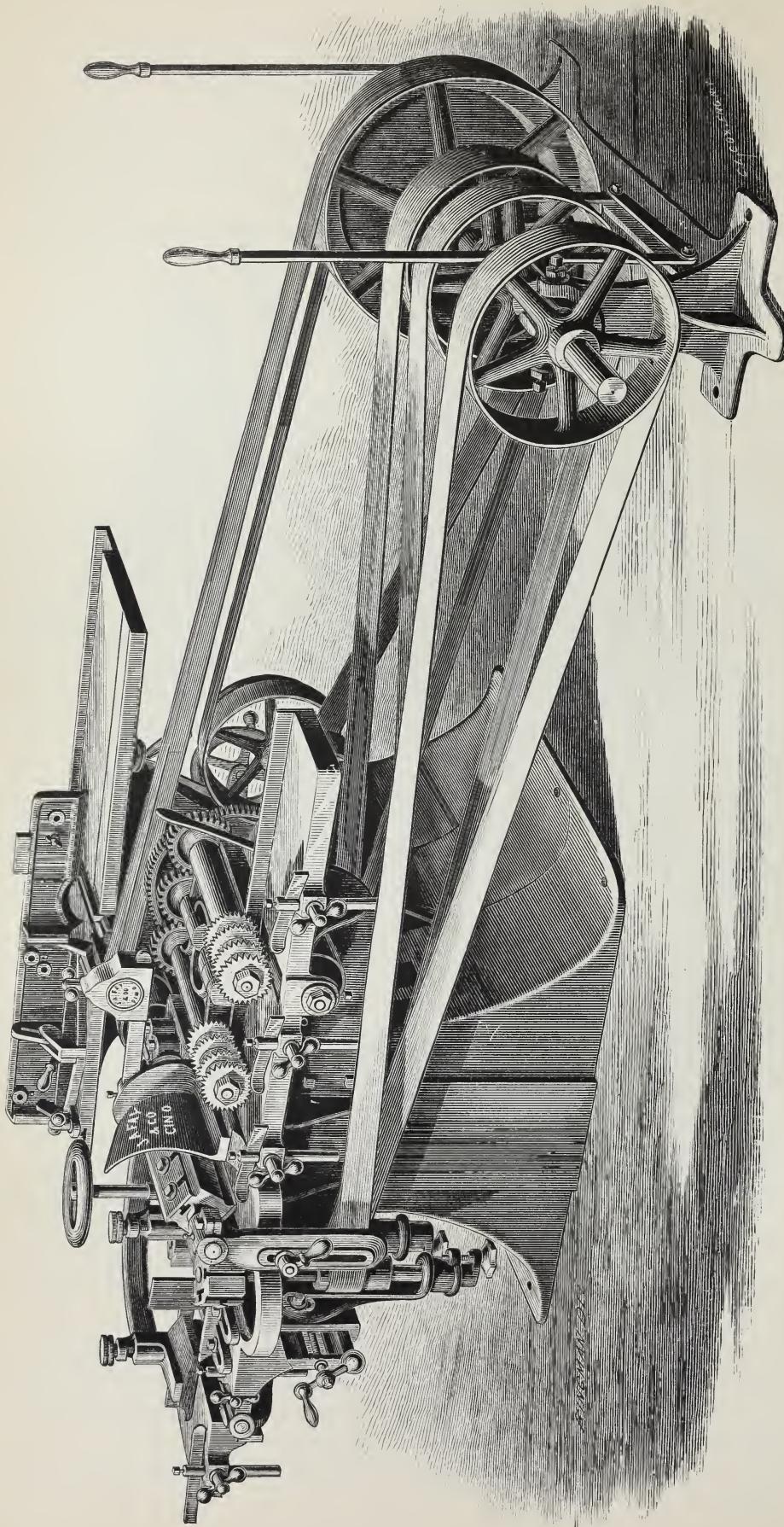
The arbor is of steel, of large diameter, and revolves in bearings supported on the column. One bearing is cast solidly to the column, and the other is moveable, being planed in a seat, the height of which to the center of the arbor is equal to one-half the diameter of the largest head to be used. The movable or outside bearing is readily detachable for the purpose of substituting different heads, by loosening a bolt at the bottom. This is a very important and advantageous feature, as it gives greater stability to the arbor and, obviating its liability to spring, renders the machine capable of performing a larger range of work.

Another very important advantage will be found in the fence, which requires no separate adjustment. Being attached to and forming a part of the forward table, it always maintains its proper position in relation to the knives. The fence has lateral adjustment, is fitted to receive pressure springs for holding down the stuff, and swings to different angles for beveling work.

Each machine is provided with an eight-inch three-knife planing head, rabbeting, jointing, and capped heads, and is fitted to receive our expansion grooving and paneling heads, and when desired can be fitted on the opposite sides with boring and routing table, with vertical and lateral adjustments to suit the size of the stuff being worked; also an attachment for dovetailing both front and end of boxes or drawers. This is attached to the rear side, fitting on the same slides of the boring table.

In the range and variety of work for which this machine is adapted, readiness of adjustment, the ease with which it is operated and kept in order, the accuracy and rapidity with which the work is performed, economy of shop room, and in durability of construction and labor-saving qualities it will be found a most superior machine.

Cylinder pulley is three and one-half inches in diameter, and should make 3,600 revolutions per minute.

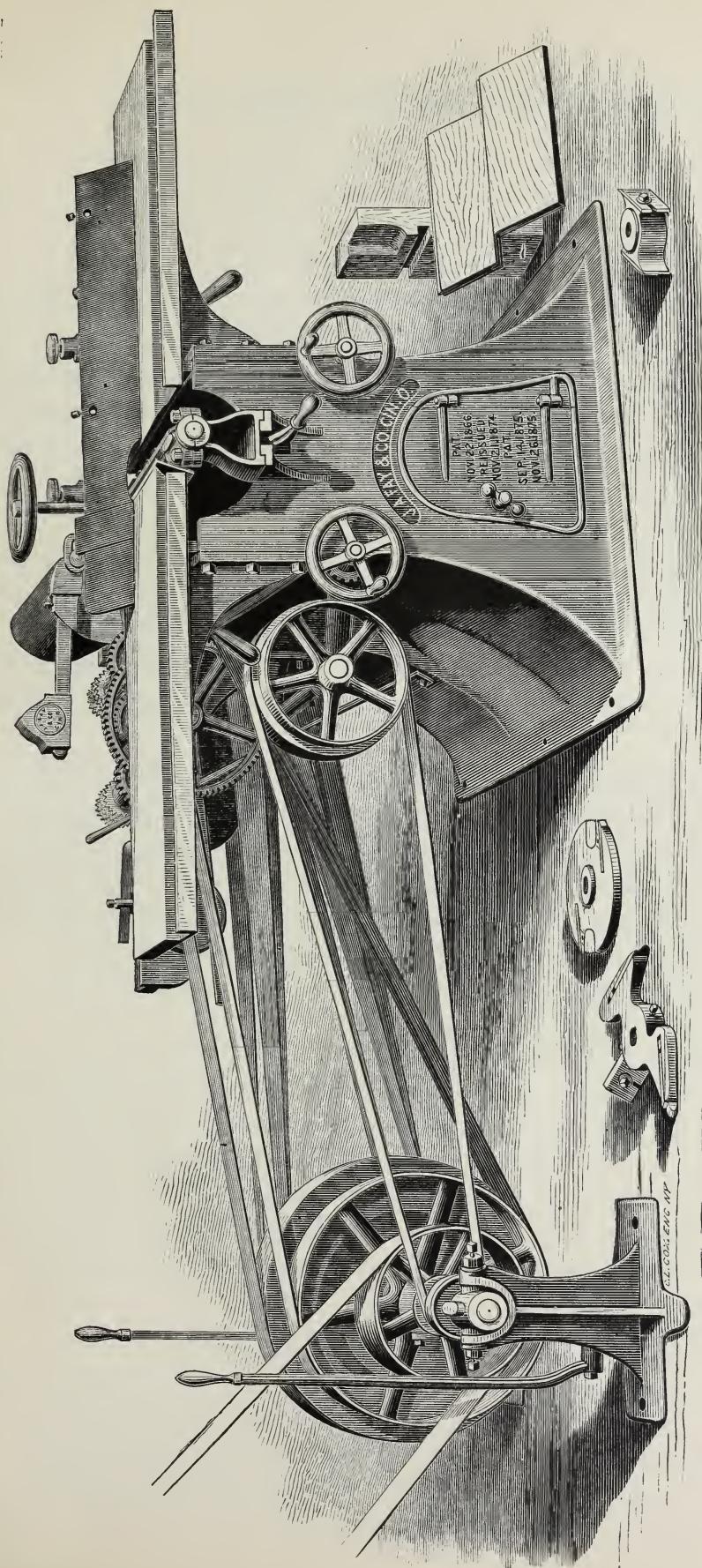


No. "D" New Patent Universal Wood Worker.

(SHOWING THE MOLDING SIDE.)

WILL WORK MOLDINGS ON ALL FOUR SIDES UP TO EIGHT INCHES WIDE.

Has all the adjustments of our large molding machines. Either side operated independently of the other.



No. "D" Patent Universal Wood Worker.

(SHOWING THE WOOD WORKER SIDE.)

WILL WORK MOLDINGS ON ALL FOUR SIDES UP TO EIGHT INCHES WIDE.

Has all the adjustments of our new Patent Variety Wood Workers, either side operated independently of the other.

Specifications of Patent Universal Wood Workers.

On the preceding pages will be found illustrations and descriptions of the J. A. Fay & Co. Solid Frame Patent Universal Wood Workers. They embrace all the essential features of the original Climer & Riley patent and its reissue, together with the recent improvements originated by ourselves, and secured by letters patent. After having thoroughly tested their capabilities we have no hesitancy in saying we believe them to be one of the most important and valuable wood working machines extant.

They are constructed in two varieties to work either one, two, three, or four sides, with separate arbors and outside bearing supports upon each side, as herewith illustrated ; also with the main arbor extending from one side to the other, with the patent outside bearing supports. This latter form of machine is of much cheaper construction, and will be found illustrated and more fully described hereafter.

Among the many purposes to which they are adapted is planing straight or out of wind, tapering, rabbeting door and window frames, rabbeting and facing inside blinds, jointing, beveling, chamfering, plowing, making glue joints, raising panels, ripping, cross-cutting, tenoning, circular molding, dovetailing, etc. The form and manner of casting the frame in one piece makes it very strong and substantial, and insures stability and permanency.

Both sides of the machine are driven from one countershaft, arranged so as to convey the power to both sides simultaneously or separately, as the operator may desire. This method of obtaining independence of the combination allows the operator to perform the work on either side without interfering with the other, and either side may be started or stopped without effecting the other. This is accomplished by means of a double friction pulley upon the countershaft, carrying two belts and operated by two levers.

We furnish five sizes of these machines; viz:

No. "A" PATENT UNIVERSAL WOOD WORKER.

This machine has the molder side to work one side, with parallel raising feed rolls, heavily weighted, with gibbed gateway, self-oiling arbor bearings, swinging bonnet, and adjustable pressure bar, with two eight-inch heads and cutters, adjustable fence and bevel rest, vertical and lateral adjusting platens or tables, outside removable bearing support for the wood worker side; also, gaining frame, saw frame, and countershaft with pulleys. The molding side will plane one side, and work moldings up to eight inches wide, stick sash, door rails, etc.

No. "B" PATENT UNIVERSAL WOOD WORKER.

This machine has the molding side to work two sides. The feed rolls raise parallel to the stuff. The arbor is of large diameter, and runs in self-oiling bearings; the gateway carrying the head is gibbed to the column and adjusts laterally across the bed. The molder side is supplied with one eight-inch and one four-inch slotted steel head and cutters, and on the wood worker side one three-knife eight-inch cutter head, with vertical and

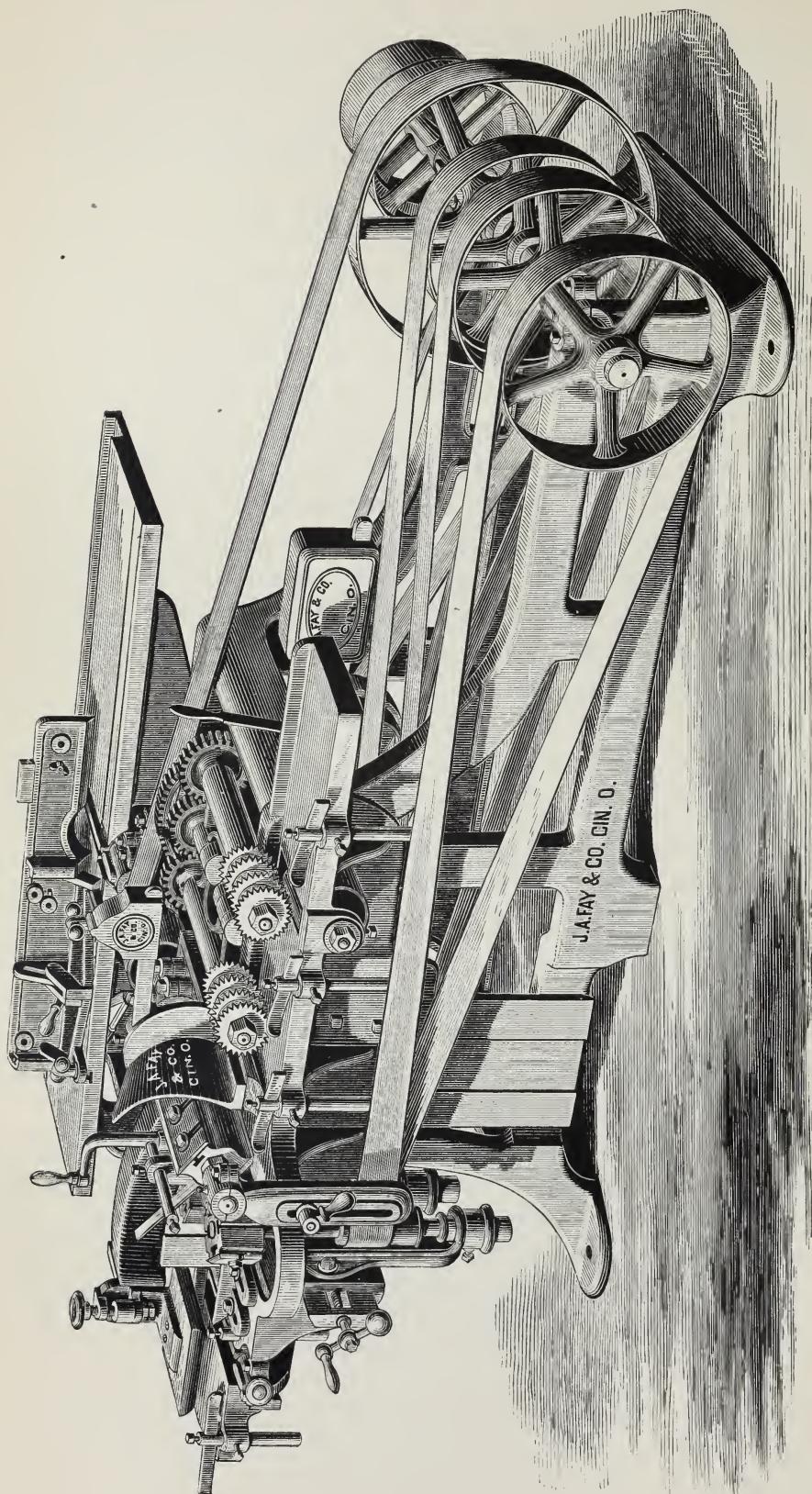
lateral adjusting tables, patent adjustable fence and bevel rest, gaining frame, saw frame, and countershaft with pulleys. On this machine the molder side has an upper head for sticking sash and doors and planing up to eight inches wide, and a vertical outside head so as to plane or work moldings on the two sides up to eight inches wide at one operation. The outside head has vertical, lateral, and angular adjustments, and runs in self-oiling steps; the feed works are of large capacity, the same as those previously described.

No. "C" PATENT UNIVERSAL WOOD WORKER.

The molding side to this machine is arranged to work three sides, and has all the improvements described in the B machine. It is fitted with one eight-inch and two four-inch slotted steel heads and cutters and one two and one-half inch molding head on the molder side, and one eight-inch three-knife head and cutters on the wood worker side, with patent adjustable fence and bevel rest, gaining frame, saw frame, and countershaft with pulleys. This differs from the preceding machine only in having an additional side head with all the adjustments, so as to plane or work moldings up to eight inches wide, on all three sides at one operation. When supplied with matching heads and cutters, it can be used to good advantage in surfacing flooring or ceiling up to eight inches wide. Thus, in addition to its capacities on the wood worker side, it will be found of an equal capacity of our large three-side molding machine.

No. "D" PATENT UNIVERSAL WOOD WORKER.

This is our largest and best machine. It is provided with the molding side to work on all four sides at once. It has two eight-inch and two four-inch slotted steel heads and cutters on the molding side; and one three-knife head and cutters with outside removable bearings upon the wood worker side, also patent adjustable fence and bevel rest, gaining frame, saw frame, countershaft, and pulleys. This forms the complete machine for doing all the different varieties of work shown and described on pages 83 and 84 of this catalogue, and also upon the preceding pages. It will surface both sides, and tongue and groove, or joint flooring, ceiling, etc., up to eight inches wide. The additional head (the under cylinder) has an independent adjustment to suit the thickness of the cut, and with the side heads raises and lowers vertically with the platen or bed. The arrangement of this molding side will be found unequalled in the ease of its adjustment and the accuracy of the work which it produces. In addition to the features which accompany the machine as described, we furnish as extra, when desired, solid and expansion groover heads, panel raising heads, molding heads, and any of the features of special work which the machine may be desired to perform. In the following pages will be found diagrams and instructions for operating, which, it is believed, will interest the intelligent operator.



No. "E" New Patent Universal Wood Worker.

(SHOWING FRONT OR MOLDER SIDE.)

WILL WORK MOLDINGS ON ALL SIDES UP TO EIGHT INCHES WIDE.

Has all the adjustments of our Patent Variety Wood Workers.

NO. "E"

New Patent Universal Wood Worker.

(SHOWING FRONT OR MOLDER SIDE.)

The machine illustrated on pages 94 and 96 is a somewhat cheaper construction of Wood Worker than the "D" machine. It will be found very desirable for all small shops that do not feel able to incur the expense of several large and expensive tools, as it combines in its organization several machines in one, and important labor-saving features, thoroughly adapted to the requirements of house-builders, carpenters, cabinet makers, agricultural and carriage shops, and in fact most every wood-working establishment.

It is made to work moldings on either three or four sides at once, as may be desired. The arbor is of large diameter, extends from the molder to the wood-worker side, with outside removable bearings.

The upper and lower heads work eight inches wide. The vertical side heads carry four knives, and have both lateral and vertical adjustment. The outer head will incline to varying angles. The lower head is provided with removable mouth-pieces, to close the gap over the cutters. It is made to adjust with the bed, and has a separate independent adjustment for accurate work.

The wood-worker side, illustrated on following page, is provided with perfectly planed and ground tables or platens like the "D" machine, and will plane eight inches wide.

It is provided with adjustable fence and bevel rest, for squaring up, planing out of wind, smoothing, jointing, chamfering, etc.

It has nearly all the adjustments of the "D" machine, and will perform all the work shown in the diagrams pages 97 to 102, inclusive.

We claim for it, that it supplies the place of several distinct machines, and performs the same work, thereby saving money to the purchaser and utilizing space and power.

It is quickly converted from doing one kind of work to another by simply changing heads—a very important item.

As a planer it will work up to eight inches wide, and plane out of wind.

It is a first-class molding machine in every respect.

It will thickness or stick sash and molding up to eight inches wide.

It is a first-class panel raiser, and will raise both sides of a panel at one operation.

It is a perfect jointing machine, jointing up to eight inches wide, or any length, and will make a perfect glue joint, square or bevel.

It is an excellent machine for gaining and plowing, and will do every variety of straight and angular work with ease and accuracy.

It is quickly converted into a rip and cross-cut saw, accurate and substantial.

It will do any kind of rabbeting, from one-sixteenth to one and three-fourths inches wide. The same head is also used for halving the ends of stuff, tenoning, rabbeting between ends, etc.

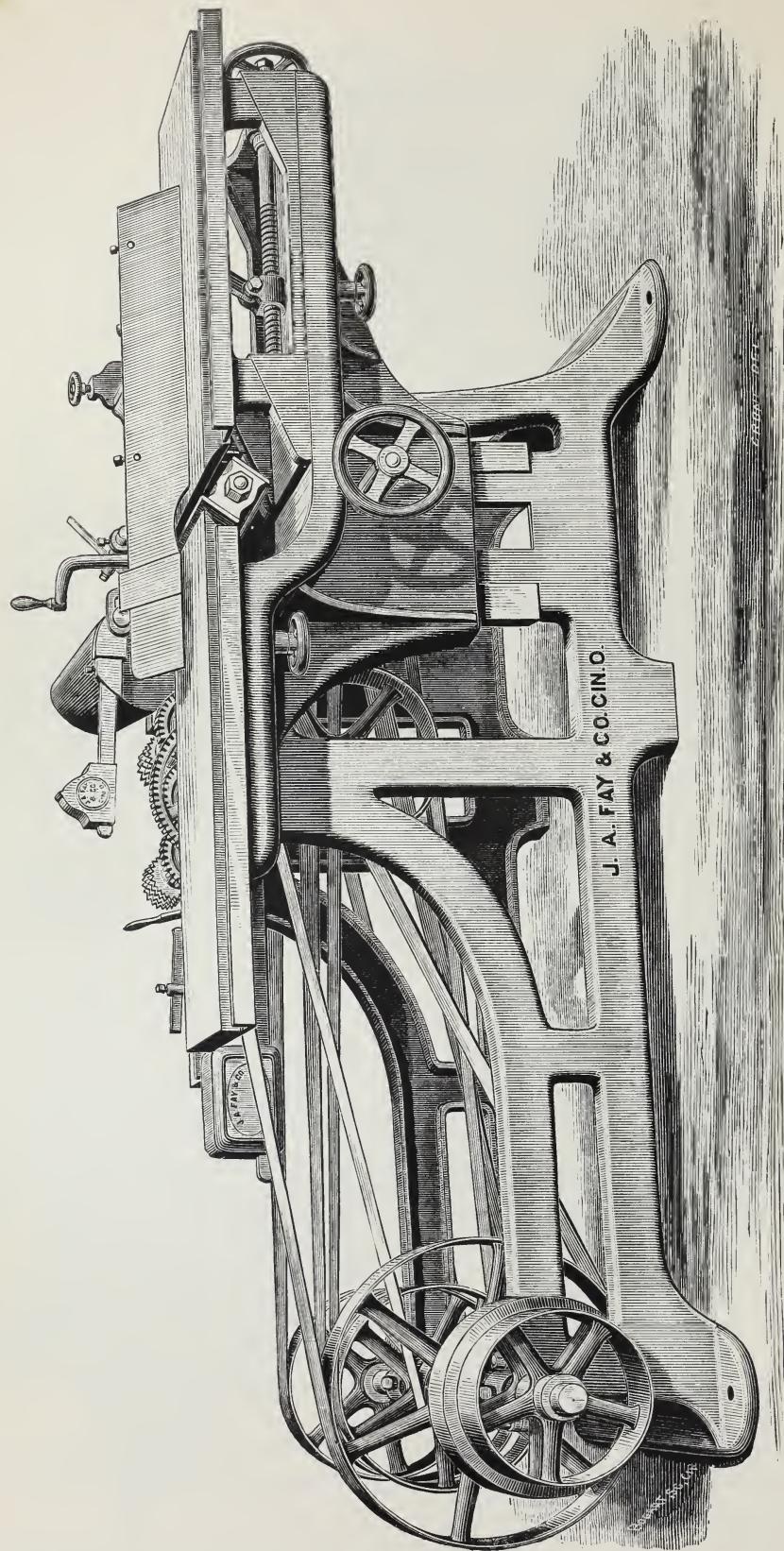
On this machine circular and elliptical molding and hand matching can be done with great rapidity and perfect accuracy.

It can be supplied with boring and routing table, for all kinds of boring and routing.

With the exception of the countershaft, which is attached to the machine, it has nearly all the advantages of the larger machine.

The wood-worker side of the machine will be found illustrated on the following page.

It has our patent tight and loose pulleys, which are twelve inches in diameter and six-inch face, and should make 900 revolutions per minute.



No. "E" New Patent Universal Wood Worker.

(SHOWING WOOD WORKER SIDE.)

WILL WORK MOLDINGS ON THE MOLDER SIDE ON ALL FOUR SIDES UP TO EIGHT INCHES WIDE AT ONE OPERATION.

For description see preceding page.

ILLUSTRATED AND DESCRIPTIVE METHODS OF OPERATING

J. A. FAY & CO.'S

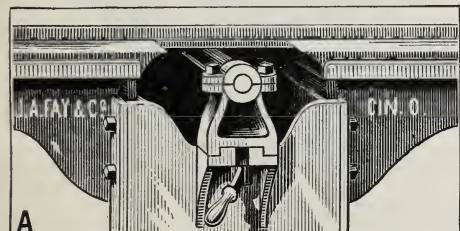
Patent Universal and Variety Wood Workers.

(FOR DIFFERENT WORK.)

The following diagrams, with the accompanying descriptions, show the best methods of manipulation to produce some of the various forms of work which may be done on our Patent Universal and Variety Wood Workers. These machines are the simplest in construction, have fewer parts to adjust, and have a larger range of work than any of the kind heretofore brought to the attention of the public.

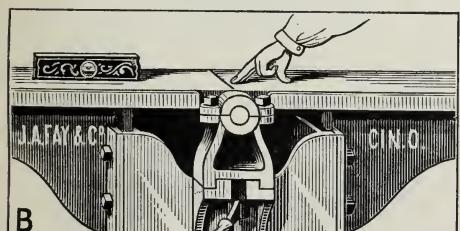
The machine should be placed so that the table will be on a perfectly level plane. If, when the level is placed lengthwise and crosswise of the table, they are found to be exactly true, then the parts of the machine are correctly in line, as the strength of the frame renders it impossible for it to warp out of true :

FIG. A.—TABLE ADJUSTMENT.



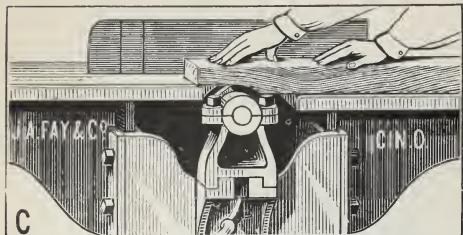
Showing the opening between the two tables when they are adjusted laterally to their fullest extent. This adjustment is made by handles which are raised during the operation, and which by their eccentric form, serve, when released, to lock the tables, preventing any end movement when set in the proper position. The tables retain their distance from the cutter head while being raised or lowered, thus allowing them to be adjusted while the head is revolving.

FIG. B. —METHOD OF LEVELING TABLES.



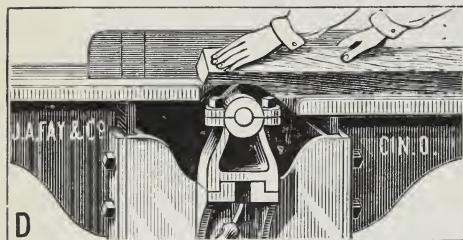
Showing the best method of leveling the machine, viz. : by having the table clear of obstructions, placing both sides of the table on the same horizontal plane, and leveling both crosswise and lengthwise. The machine after being leveled, bolted to the floor, and belted, is then ready for any desired operation, the first one of which we will describe is ordinary surfacing. The cutter head knives should be thoroughly sharpened, edges made perfectly straight and the same distance from the center of cutter-head, so that each knife will cut to the same point. Upon these directions being followed, much of the success in producing a perfect surface depends. In setting the knives, place the back table on a line with the periphery of the cutting edge, lay a straight edge on the table so that it will project over the head, then bring each knife in contact with the straight edge. This should be done at different points of each knife in order to have them perfectly true.

FIG. C.—POSITION OF TABLES IN PLANING OUT OF WIND.



Showing the position of the hands in the operation of truing up or planing out of wind. The back table should be on a level with the periphery of the cutting edge, as if above that position the cut would gradually run out to nothing ; and if below that position, the piece would be planed hollowing and clip out at the last end. Precision in this particular is necessary to produce a perfectly straight edge. The thickness of cut is regulated by lowering the front table. The piece should be guided on the proper plane to produce the required surface until the planed part reaches the back table, and then it should be constantly kept in contact with that surface, as that then forms the guide to produce the desired perfection in the surface being planed. The fence is fastened to the front table by hand wheels and screws, which, with slots and extra holes, allow it to be moved crosswise to any part of the table. This is an advantage in forming square or bevel glue joints or any other squaring up, as the fence can be moved to other parts of the knives when the edge being worked upon becomes dull.

FIG. D.—POSITION OF TABLES IN CORNERING.



Showing the operation of plain cornering or bevel-edging. The fence is set to the angle required, and the same precaution is necessary regarding the back table and cutting edge as in the preceding example. The front table should be lowered to the depth the corner is desired to be cut.

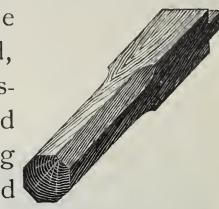
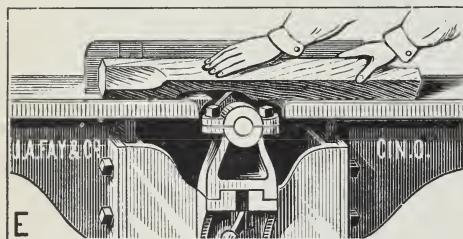
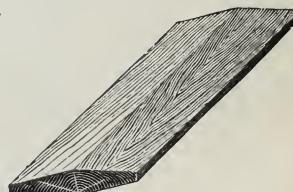


FIG. E.—ARRANGEMENT OF TABLES FOR CHAMFERING.

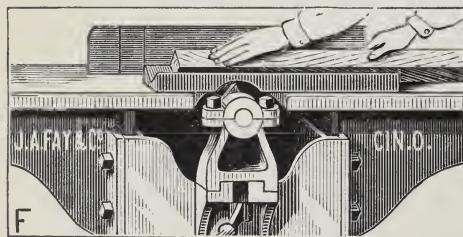


Showing the process of cornering or chamfering part of the way on a piece, or between the ends. In this method both tables are lowered to an equal distance below the cutting



edge, according to the depth to be worked, stops should be placed indicating the length of cut to be taken. Place the end of the piece against the stop, then lower gradually until the full cut is made, holding the piece firmly in order that a smooth and perfect curve may be made at end of cut.

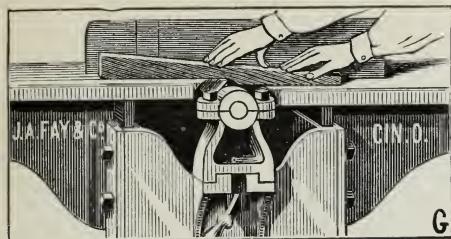
FIG. F.—ARRANGED FOR BOX CHAMFERING.



Showing the tables in the same position as the preceding examples, with the addition of a box constructed to correspond to the shape of the piece to be cornered, and the stops placed permanently in the box. By this arrangement duplicates can be produced at any time with greatest exactness. In any of the foregoing methods of cornering, any form of molding can be made suitable for the ornamentation of such parts.

coves can be put on the corners, or
ornamentation of such parts.

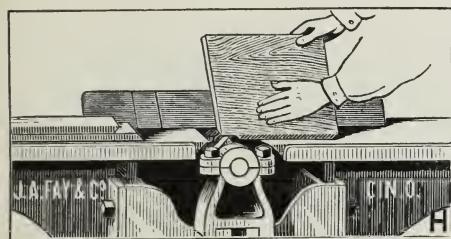
FIG. G.—TABLES ARRANGED FOR TAPERING.



Shows the position of the tables in cutting a taper. The back table should be raised to the position indicated in Fig. C, and the front table lowered sufficiently to bring the line of the desired taper on a line with the back table. If it can not be done at one operation, the taper can be divided and cut off by two or more operations. This process can be applied also to straightening a tapered piece, or one that is crooked or curved.



FIG. H.—JOINTING AND MITERING.



In mitering or forming joints at any angle, the fence is set to correspond to the desired angle, and the front table lowered to cut off the form at one operation. The diagram shows the process of mitering, which can be done

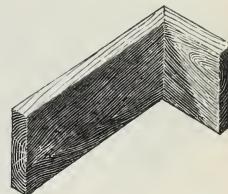
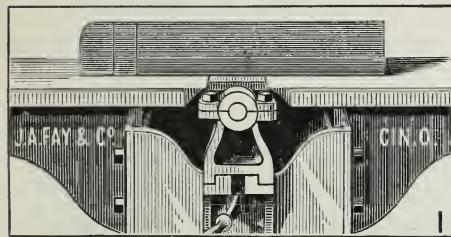
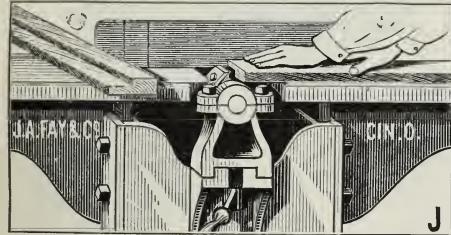


FIG. I.—TABLE ARRANGED FOR RABBETING.



Shows the method of arranging the tables for rabbeting. The tables are set to one level, the rabbeting head being substituted for the planing-head. The rabbeting iron is inserted between the tables, forming a connection between them, and thus giving a support for the stock being worked.

FIG. J.—MACHINE ARRANGED FOR RABBETING.



by the fence. The depth of the rabbet is graduated by the vertical movement of the tables.

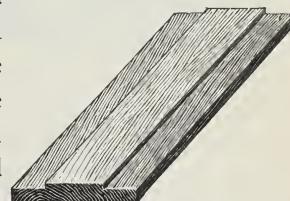
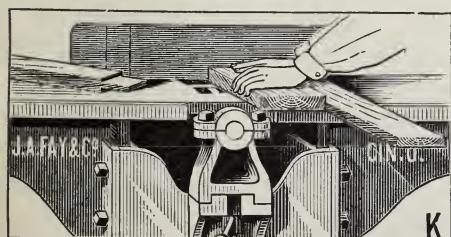


FIG. K.—MACHINE ARRANGED FOR TENONING.



In the operation of halving or tenoning, the rabbeting-iron is used as in rabbeting. The tables are placed on the same level, and a slide arranged to fit in the grooves in front. The lengths of tenons can be gauged by the fence, or by stops on the slide, and the slide can be fixed to cut square or angle tenons. The same cutter-head is used as in rabbeting, and the tenon may be made longer than the cutter-head by repassing the stuff over as often as may be necessary to increase the length.

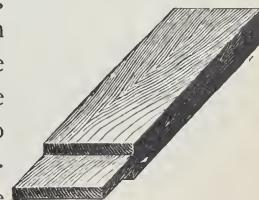
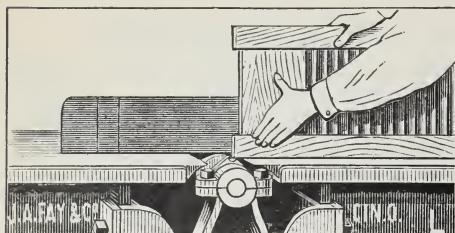
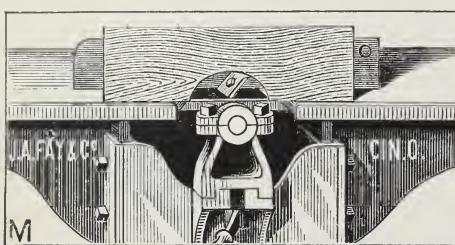


FIG. L.—RABBETING AND JOINTING WINDOW BLINDS.



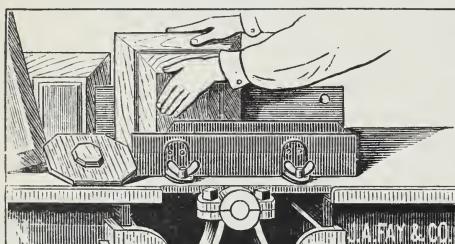
The back table should be at the same height as the cutting-edge of the jointing-head. The fence is set to the desired angle and width of rabbet.

FIG. M.—MACHINE ARRANGED FOR PANEL-RAISING.



being cut. The back and front panel-boards are cut out to permit the heads to revolve inside, and the amount of projection of the cutting-edge will be the depth of the panel to be raised. One or both sides of the panel may be raised at the same time, and they may be made of different widths on the same panel by using heads of different diameters. The panel-heads are made in pairs for back and front, and are retained in position by set screws.

FIG. N.—RAISING DOOR PANELS.



The front fence is attached to a slide board in the front groove of the table by angle-irons, slotted for graduating to the thickness of the panels. This appliance is the same on all our wood-workers, and gives the most perfect satisfaction. Special heads of any diameter, for the capacity of the machine, made to order.

Shows the panel being passed through the entire attachment in use. The front board is attached to a fence by bolts passing through springs placed between the front fence and front board, thus giving a flexible pressure for inequalities in thickness.

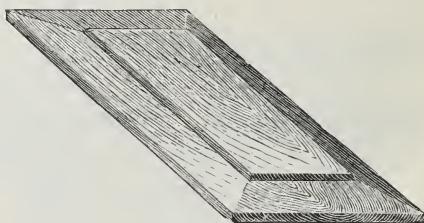
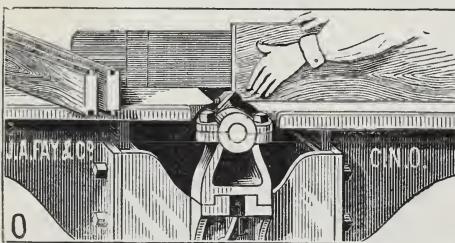


FIG. O.—MACHINE ARRANGED FOR HAND MATCHING.



By placing the fences at an angle, tongues and grooves can be cut to any angle—an advantage over other hand-matchers. The stock may vary in width, or be tapering, the difference of form requiring no extra adjustment.

In the manner herein shown, the process of hand-matching or tonguing and grooving can be perfectly accomplished. The matcher-heads are placed on the mandrel, the fence forming a guide for the back head, and a fence attached to a side board adjusted to the front head, forming a guide for it.

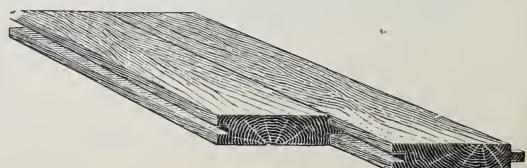
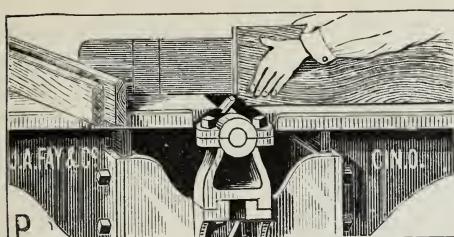
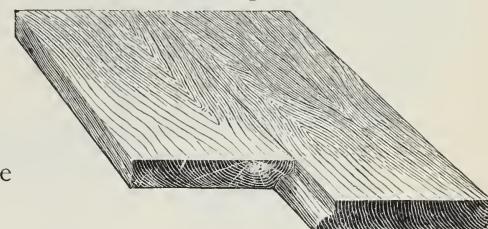


FIG. P.—MACHINE MAKING RULE JOINTS.

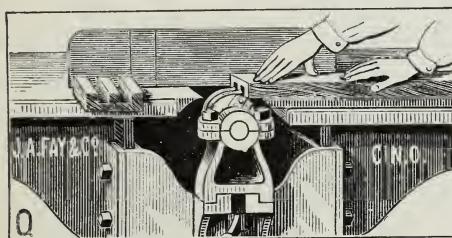


The operation shown here is that of making rule or table joints performed by the same process as that described in hand matching, heads and cutters

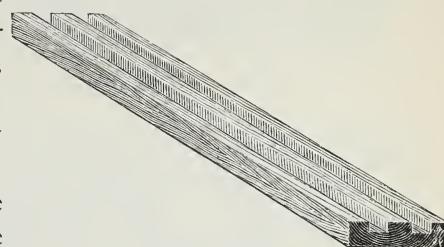


to suit the required joint being substituted for the matcher heads.

FIG. Q.—MACHINE ARRANGED FOR PLOWING.

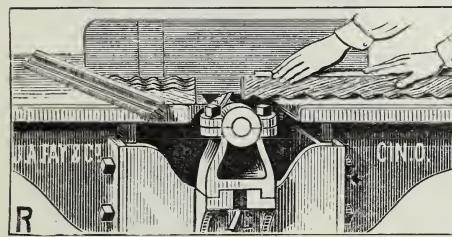


This illustration shows the operation of grooving or plowing. This is performed with the grooving or gaining-head and one or more grooves can be cut, as in window

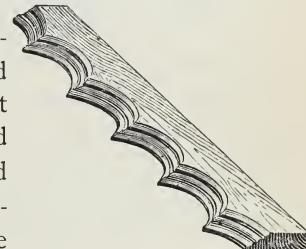


frames. In grooving, the tables are on the same level, and the depth of the groove is gauged by the distance the tables are lowered below the periphery of the cutters.

FIG. R.—MAKING WAVED MOLDINGS.

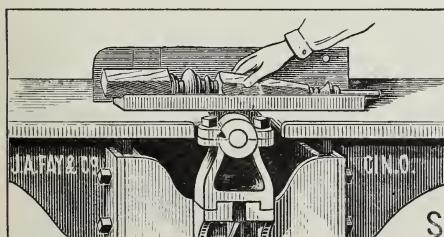


Shows the tables arranged for working waved moldings similar to that done on a Shaper and Friezer. A collar is placed on the cutter-head or spindle, against which the



pattern upon which the molding to be worked is fastened. This is passed over the head with the fence for a guide, the tables being lowered sufficiently to allow the pattern free motion over the spindle. Oval and circular waved molding can be made by constructing proper guides as indicated above. These waved moldings can be made on the face or edge of oval, circular, or straight molding by modifications of patterns, etc., as experience may dictate.

FIG. S.—SQUARING UP NEWELS OR BALUSTERS.

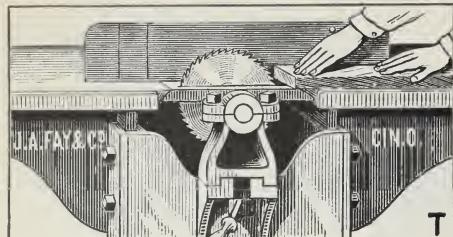


Squaring up the unturned parts of newels, balusters, etc., is done with the straight cutter-head. This figure shows the method of dressing between the turned parts,



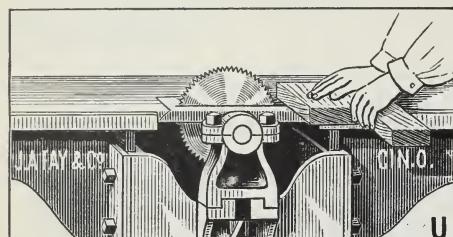
which is the same as shown in Fig. F, with the plain corner box, or by making a sliding box into which the piece is placed and passed over the cutter head with the form in which it rests. The rests or forms should be constructed to conform to the shape of the stock whether taper or straight. In this way many operations can be performed with speed and accuracy which are tedious and difficult when done with hand tools.

FIG. T.—MACHINE ARRANGED FOR RIPPING.



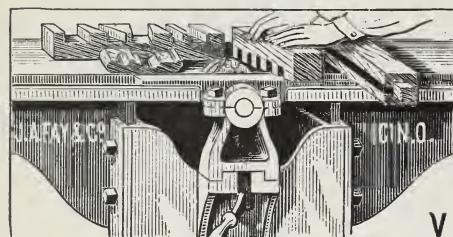
A circular ripping saw can be placed on the mandrel between two collars, and the opening between the tables filled with a board fitted to the tables, making a continuous saw table, upon which ripping to any bevel can be done by the aid of the fence.

FIG. U.—MACHINE ARRANGED FOR CROSS-CUTTING.



In this operation a circular cross-cutting saw is used, the fence being removed, and the slide in the back side of the table placed over the opening, thus forming in connection with the saw table a smooth top the entire width of the table. Cross-cutting to any angle can be done by means of a guide attached to the slide board.

FIGS. V & W.—ARRANGED FOR STRAIGHT AND ANGLE GAINING.



For the purpose of gaining, the tables are placed on the same level, with the slide in the back of the table across the opening between the tables. The depth of the gain is gauged by the distance of the table below the cutting edge of the gaining-head. The slide board of the gaining-frame is placed in the groove in front of the table, with the guide-bar at right angles to the gaining-head. The stock is placed in front of the guide and operated as in cross-cutting.

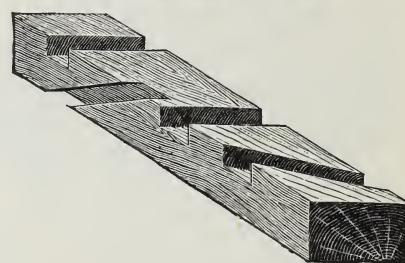
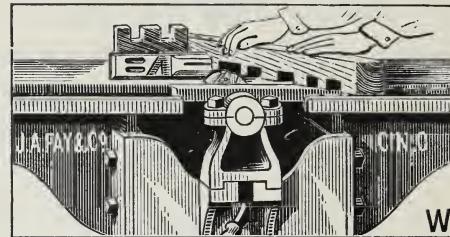
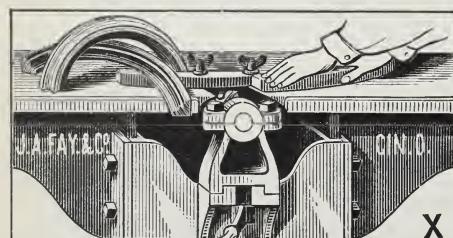


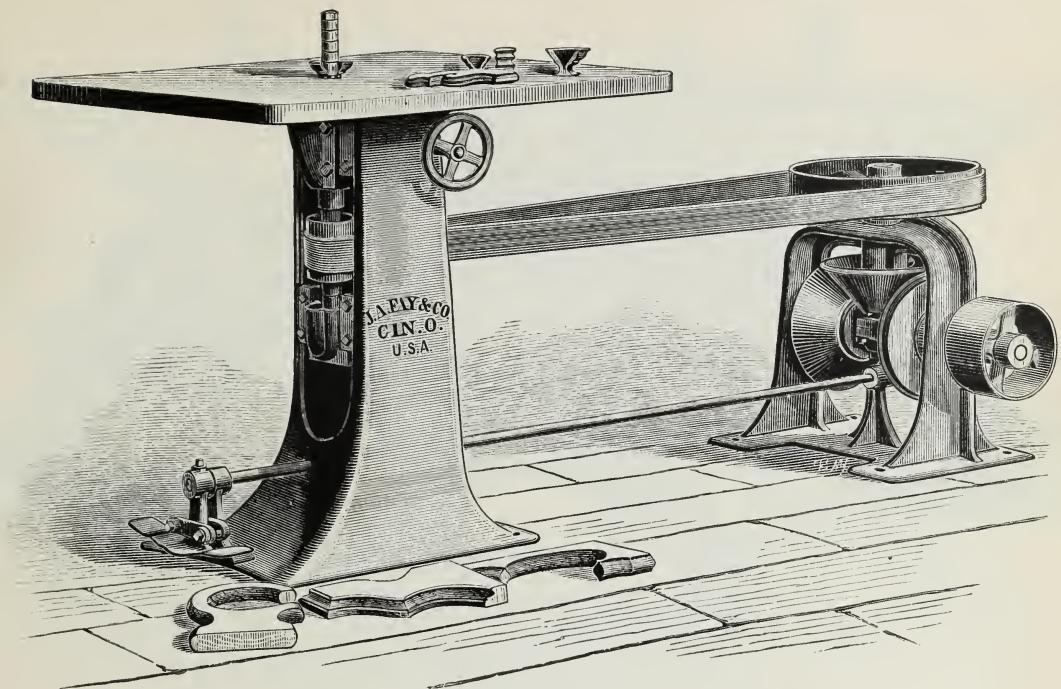
FIG. X.—MACHINE ARRANGED FOR CIRCULAR MOLDING.



Oval and circular moldings can be worked on these machines in the most expeditious manner. In sawing the segments, the direction of the grain with relation to the molding head should be considered so there will be as little tendency as possible to split off. The form to be fastened to the tables should be the same thickness and shape as the inside of

the segments. The tables are the same height, or a small cut may be taken off the highest part of the molding to insure perfect work, by lowering the front table below the periphery of the deepest part of the molding cutters. A holding board should be made the same circle as the outside of the segments and one half inch wider than the segment, to extend over and bear against the form.





Patent Edge Molding and Friezing Machine.

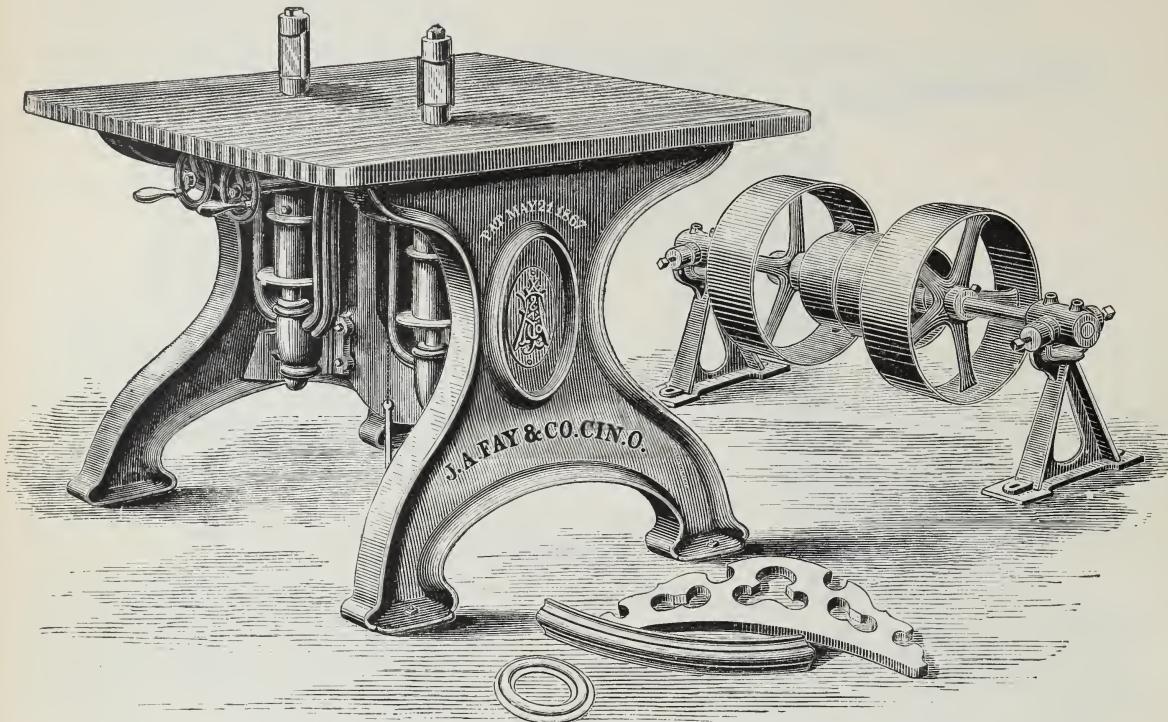
This machine is intended for edge molding with a reversible motion of the spindle, so that, when desirable, the direction of the cut can be changed to run with the grain of the wood. The frame in which the spindle revolves is adjustable vertically by a screw and hand wheel. It is planned to fit into the column of the machine, the pull of the driving belt coming against the body of the machine, with no possibility of loosening the gibbs or allowing vibration from other causes.

The driving and reversing power is communicated through a countershaft with patent friction pulleys, one of which is fixed on a vertical shaft on which is the driving pulley. The horizontal shaft carries the reversing frictions, which are brought into contact with the friction on the vertical shaft by a treadle at the foot of the operator. This arrangement operates without difficulty, and obviates the use of the old-style quarter-twist belt.

The spindle is arranged to receive chucks with different sized stems for light and heavy work. The table is of wood or iron, having the hole through which the spindle projects arranged with concentric rings for different sized cutters. The cutters are made of solid steel, to cut in either direction, and of any practicable size or shape.

It is especially adapted to the wants of carriage and furniture manufacturers, or any business in which there are short curves and quick changes in the work to be done.

The pulley on the countershaft is eight inches in diameter and four and a half inches face, and should make 900 revolutions per minute.



NO. 2

Edge Molding and Shaping Machine.

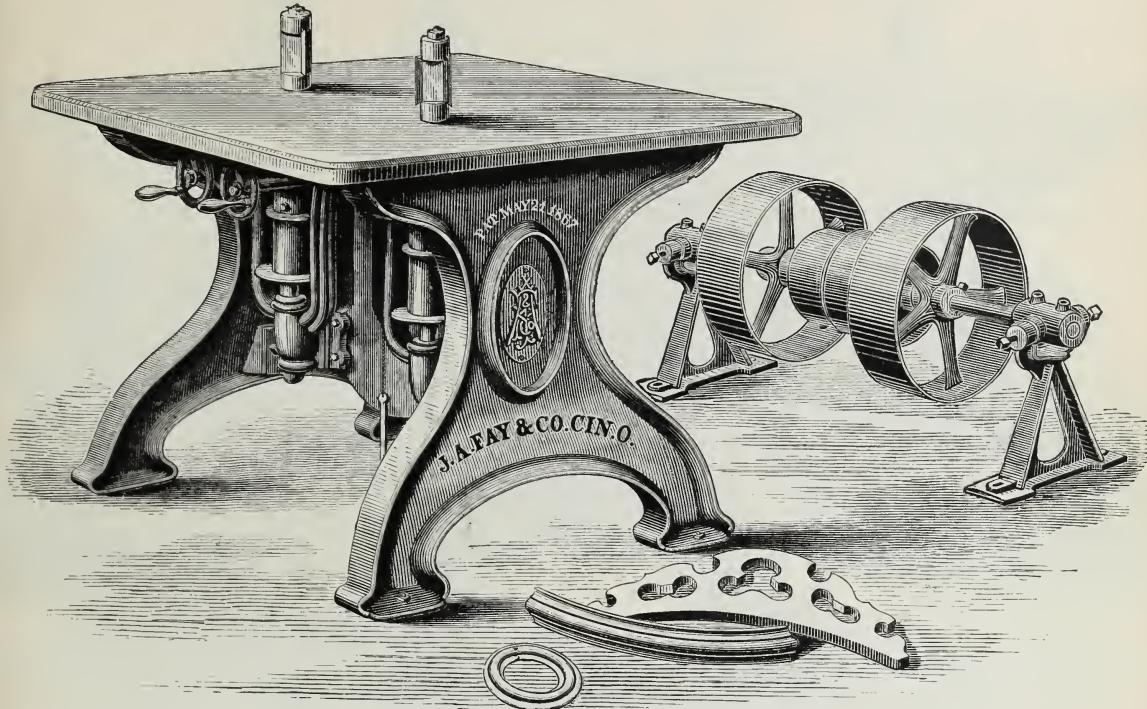
(WITH WOOD TABLE AND ELEVATING SPINDLE FRAMES)

The accompanying engraving is a true elevation of our No. 2 Edge Molding and Shaping Machine. It is very substantially constructed in every part. It is adapted to every variety of straight and irregular work, besides almost numberless purposes, and is an indispensable machine for saving labor in railroad, carpenter, cabinet, and carriage shops, etc. It embodies recent improvements which greatly increase its efficiency and add to its value.

The spindles are of large diameter, run in gate ways, having connected bearings which have a vertical adjustment by means of the hand wheel at the front of the table, so that the cutter heads can be varied above the table when required to work wide or curved moldings, brackets, etc.

The table of this machine is made of thoroughly seasoned cherry and black walnut strips glued together, and fastened to cross girts, so that it cannot warp or split, and is 54x44 inches wide. The distance between the spindles from center to center is twenty-six inches.

The patent safety guards over the cutters for the prevention of accident to the operator can be readily attached to these machines when wanted. One set of plain heads with cutters and collars accompany each machine; also a floor countershaft, supplied with our patent tight and loose pulleys, which are ten inches in diameter and six-inch face, and should make 784 revolutions per minute.



NO. 2

Edge Molding and Shaping Machine.

(WITH IRON TABLE AND ELEVATING SPINDLE FRAMES.)

This machine is highly valued in railroad, carpenter, and machine shops, pattern makers, piano-forte and cabinet work, for the manufacture of carriages, picture frames, sash, agricultural implements, etc.

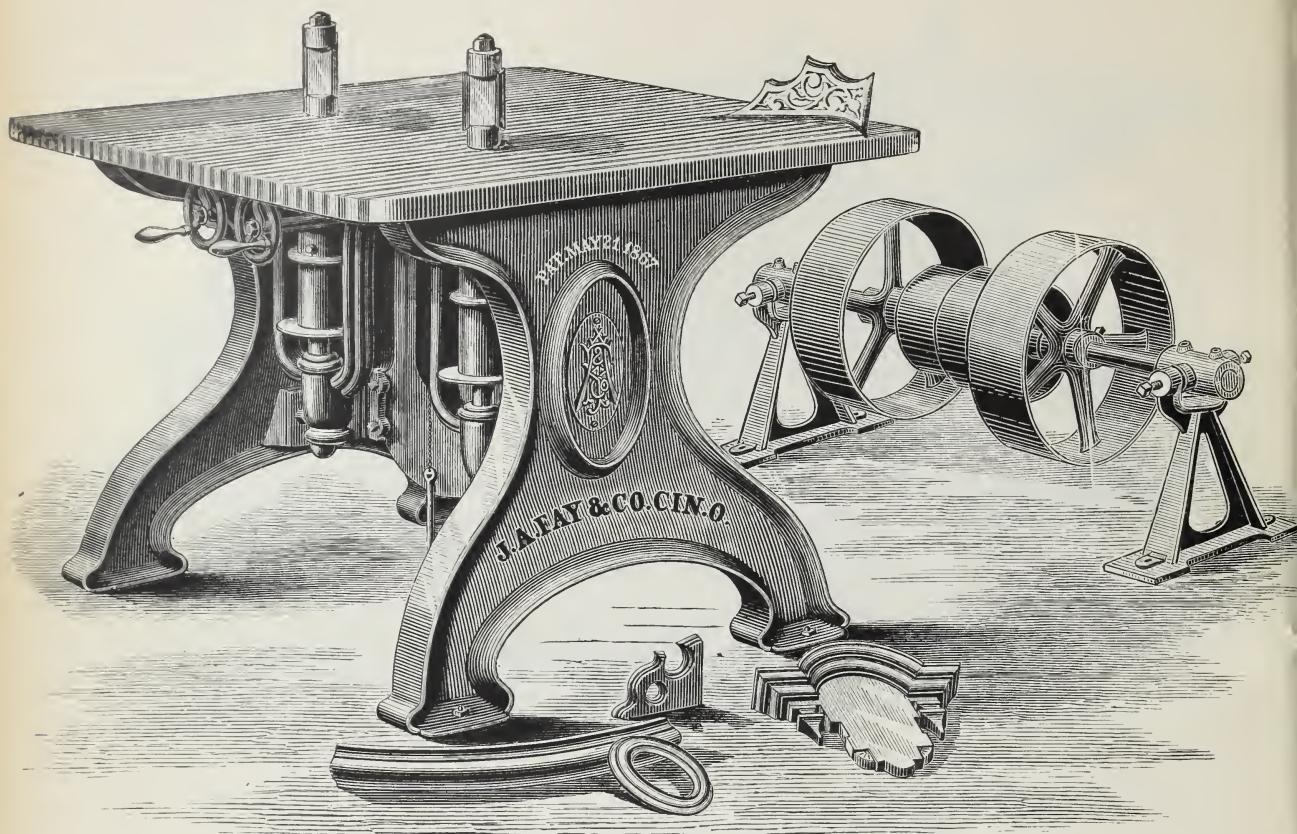
The frame is very heavy and substantial, every part made of the best material and workmanship, and will be found thoroughly capable of cutting straight moldings, and also the most irregular forms and warped surfaces.

The spindles are of large diameter, run in gate ways having connected bearings cast solid to them so as to be always retained in line, which are filled with peculiar lining metal for preventing friction, and are self-oiling. The table is 54x48 inches, and the spindles twenty-six inches from center to center.

The gate ways carrying the arbors have a vertical adjustment by means of the hand wheels at the front of the machine so the cutters can be varied above the table to work wide or curved moldings, etc. The cutter heads are made of hardened steel, and are independent of the arbors so that any size or number of heads can be used without disturbing the arbors ; one set only being necessary for the machine.

The cutters are held in the heads by end pressure, and wide cutters can be used with safety and without vibration. The patent safety guards can be applied to this machine when desired at a very small cost.

This machine is supplied with floor countershaft, hangers, and our patent tight and loose pulleys, which are ten inches in diameter and six-inch face, and should make 784 revolutions per minute.



NO. 3

Edge Molding and Shaping Machine.

(WITH WOOD TABLE AND ELEVATING SPINDLE FRAMES.)

The machine represented above is adapted for shaping, molding, and planing all kinds of curved and irregular work to a templet, and is almost invaluable to agricultural implement, carriage, sash and door shops, etc., and will be found adapted to the very heaviest work.

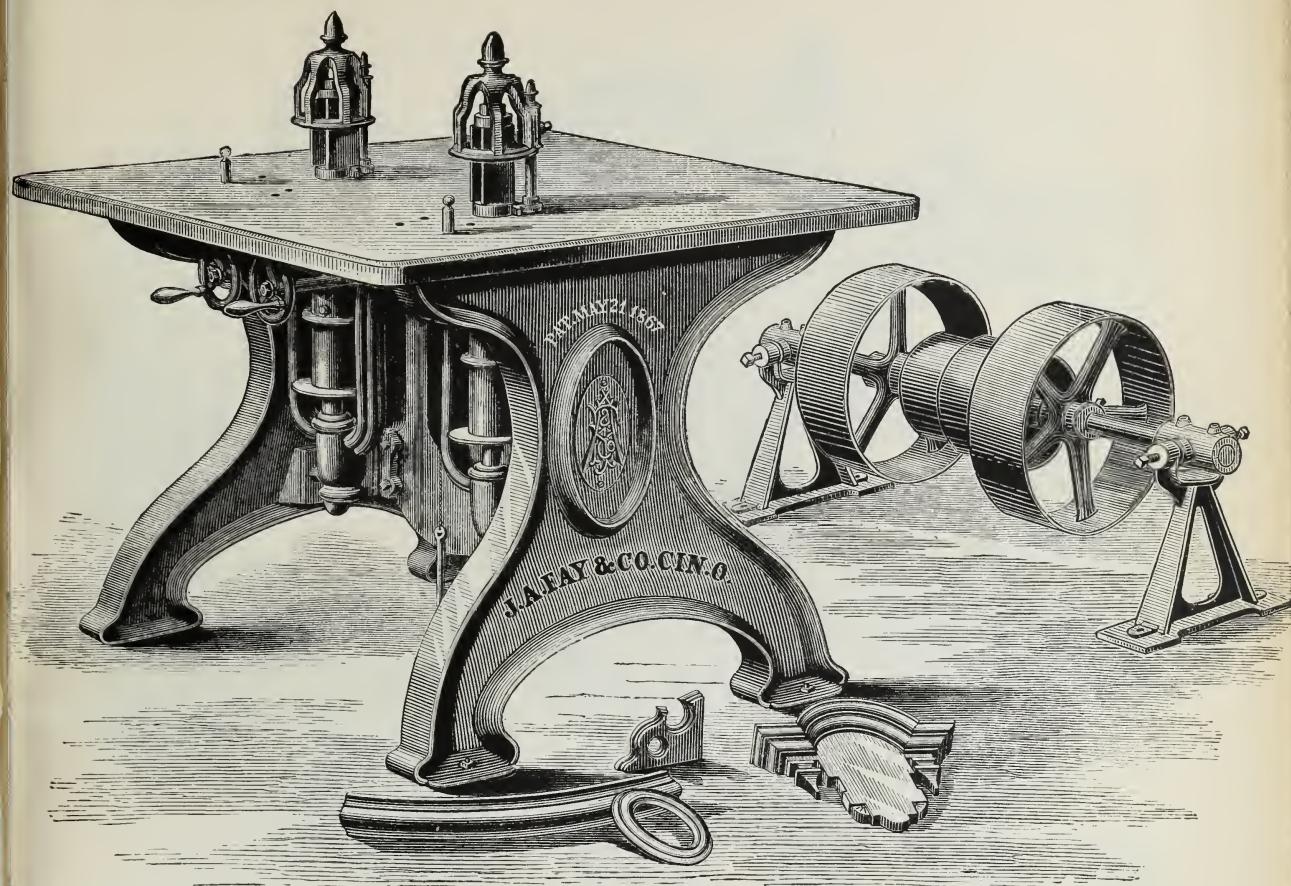
The spindles are of large diameter, running in gateways having connected bearings cast solid to them, which revolve in opposite directions, being both fitted with the same shape of cutter. They are used alternately, as the direction of the grain of the material may render necessary. By this arrangement, however warped or curved the pattern may be, the cut is always with the grain, leaving perfectly clean work. The table is 54x44, made of seasoned cherry and black-walnut glued up in narrow strips.

The gateways carrying the arbors have a vertical adjustment by the hand wheels at the front of the table, allowing the cutters to be varied to any width above the table required. The heads are made independent of the arbors, of hardened steel; will receive any size of cutters, which are held by end pressure.

The very widest cutters can be used without the least trembling.

Our patent safety guards over the cutters can be supplied at small cost when desired.

Countershaft, hangers, and pulleys are furnished with our patent tight and loose pulleys, which are ten inches in diameter and six-inch face, and should make 784 revolutions per minute.



NO. 3

Large Size Edge Molding and Shaping Machine.

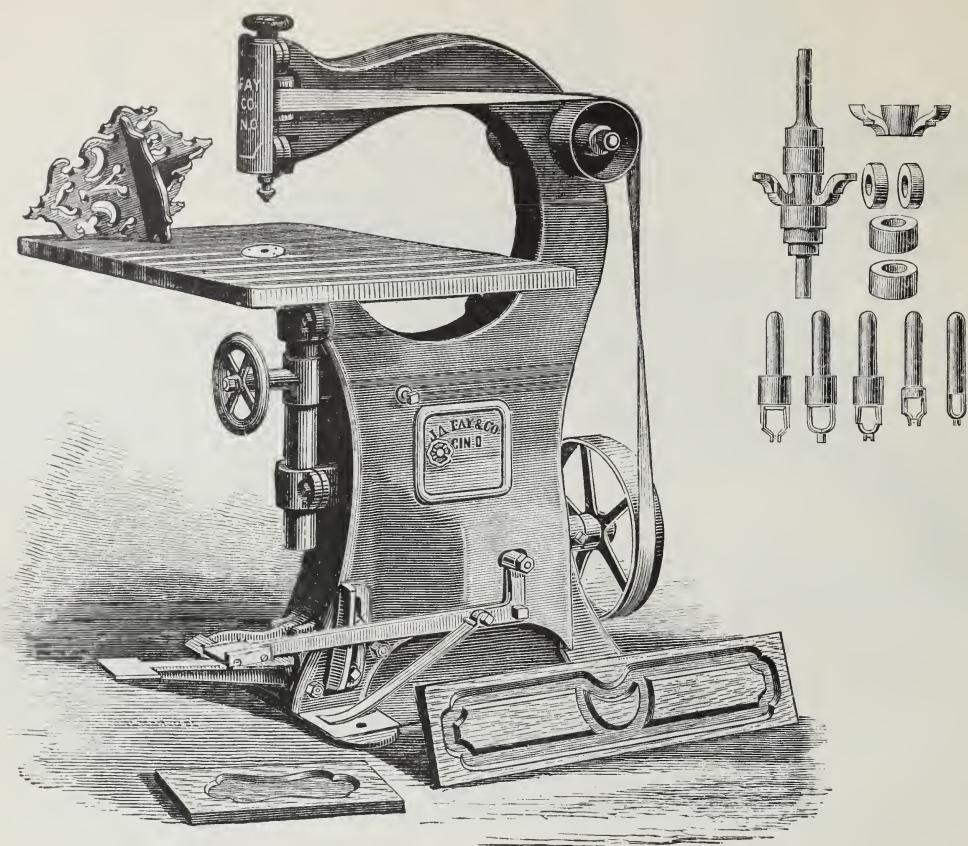
(WITH IRON TABLE AND ELEVATING SPINDLE FRAMES.)

This machine has been erected from new designs with special reference to the work to be performed, and is adapted to perform the heaviest description of work as well as light.

The frame is very heavy and substantial, most thoroughly built, and will be found thoroughly capable of cutting straight moldings, also the most irregular forms and warped surfaces required in wood. The material to be formed is attached to a wooden templet, which is passed against the loose collar on the spindle, the cutters shaping it to the exact form of the pattern.

The vertical spindles are of large diameter, twenty-six inches between centers, and revolve in opposite directions; both are fitted with the same shape of cutter, and used alternately as the grain of the wood may render necessary. The spindle frames have connected bearings so as to be retained always in line; also a vertical adjustment to allow the cutters to be raised or lowered above the table to suit wide or curved work. The heads are made of hardened steel. The cutters are held by end pressure, and the widest may be used without trembling. The table is made of iron, is 54x48 inches, and planed perfectly true. We furnish our patent safety guards over the cutters to prevent possibility of accident to the operator at a small cost when wanted.

The floor countershaft has our patent tight and loose pulleys, which are ten inches in diameter and six-inch face, and should make 784 revolutions per minute.



Patent Carving, Paneling, and Molding Machine.

This is a very effective machine for producing carving and recessed or relieved panels on the surface of lumber; also for edge molding, ornamenting, etc., and will work any design of panels required in furniture, piano, coffin, or desk factories.

It is easy to keep in order, convenient of adjustment, at all times under perfect control of the operator, and is unequalled in the amount and range of work it will perform.

It is constructed on a hollow iron column, with the cutter spindle working from above, which receives its motion by friction pulleys inside of the column. The table is quickly adjusted to suit the required depth of molding for panels by means of the hand wheel and screw, and also elevated to bring the material in contact with the cutter by means of a treadle.

The guide collar is attached to the spindle above the cutter, admitting of the use of any size cutter without altering the size of the collar. When used for surface paneling, the pattern is placed over the piece to be carved with openings between, which affords the operator a view of the work as it progresses, enabling him to judge whether the shape of the pattern is being accurately followed or not.

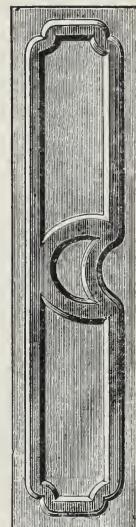
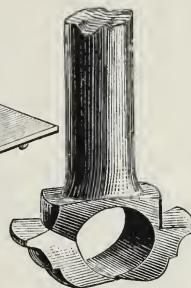
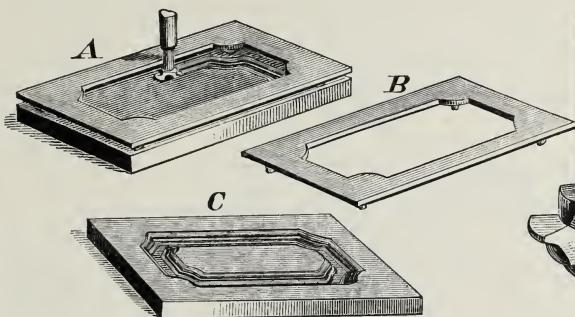
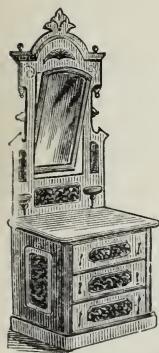
For edge molding, an adjustable bearing is placed in the table, which forms a support for the lower end of the cutter, as will be seen in the accompanying diagram. The cutters work perfectly free, cut clean and smooth whether revolving to the right or left, and are instantly secured by means of the hand wheel at the top without the use of set screws. Each machine is furnished with five cutters and patterns for paneling, also full instructions for operating.

The driving pulley is eight inches in diameter and five-inch face, and should make 1,100 revolutions per minute.

SPECIMENS OF WORK

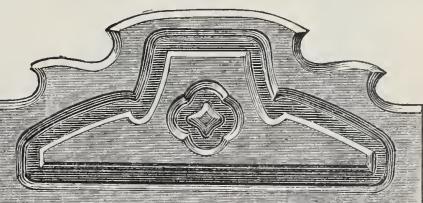
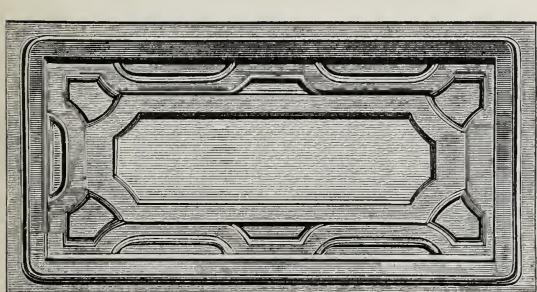
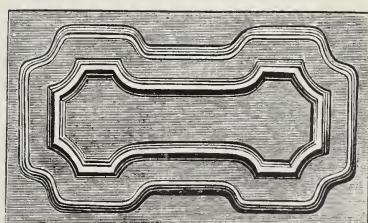
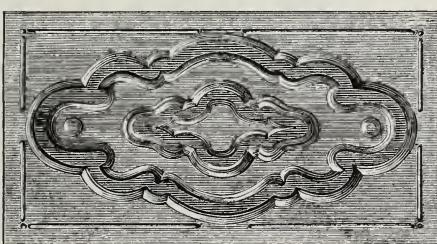
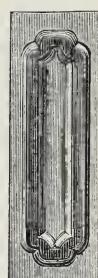
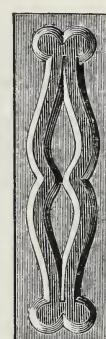
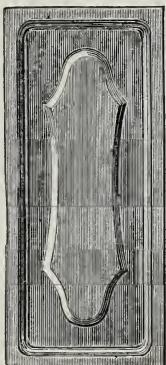
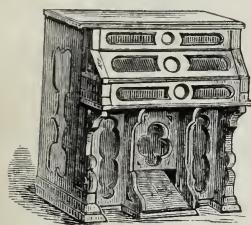
DONE ON

J. A. Fay & Co.'s Patent Carving, Paneling, and Molding Machine.



DIRECTIONS FOR OPERATING.

For paneling or cutting designs in the solid wood (Fig. C.), prepare a template (Fig. B) of the form desired. Place this template over the piece to be carved with openings between (Fig. A) for the escape of chips, and to allow a view of the work as it progresses. The template requires to be as much smaller than the panel to be cut as the outside cutting edge of cutter extends beyond the line of directrix.

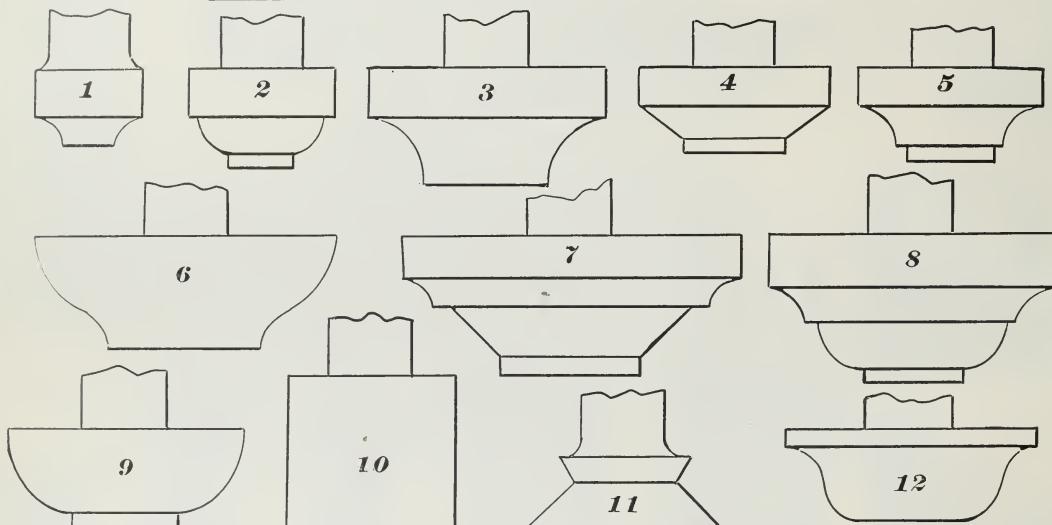


CUTTERS FOR USE ON

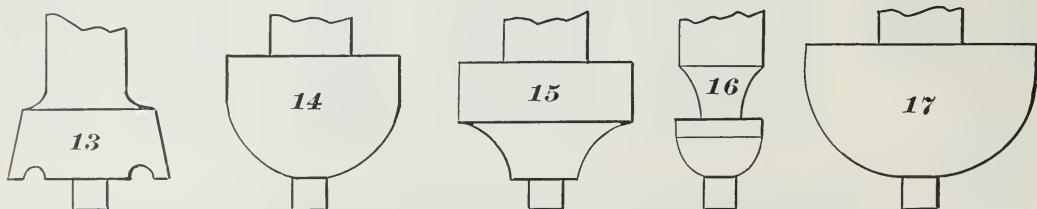
J. A. Fay & Co.'s Patent Carving, Paneling, and Molding Machine.

These cutters are made from the very best grades of English cast steel with the shape of the mold turned on them. They are made with large clearance and produce a beautiful finish on the work. The surface molding or paneling cutters have clean cutting edges, and will penetrate the wood and work perfectly smooth while running in either direction.

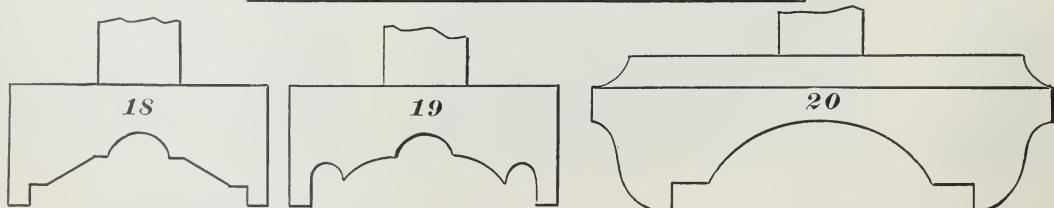
Surface or Paneling Cutters.



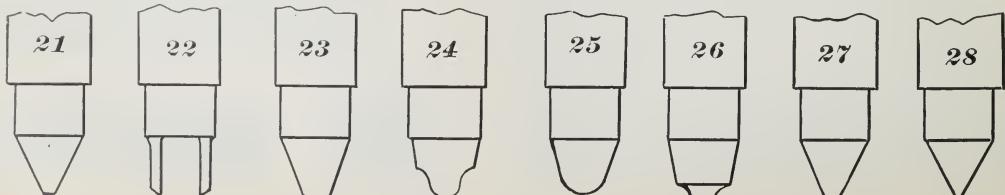
Edge and Bracket Molding Cutters.



Rozette Cutters.

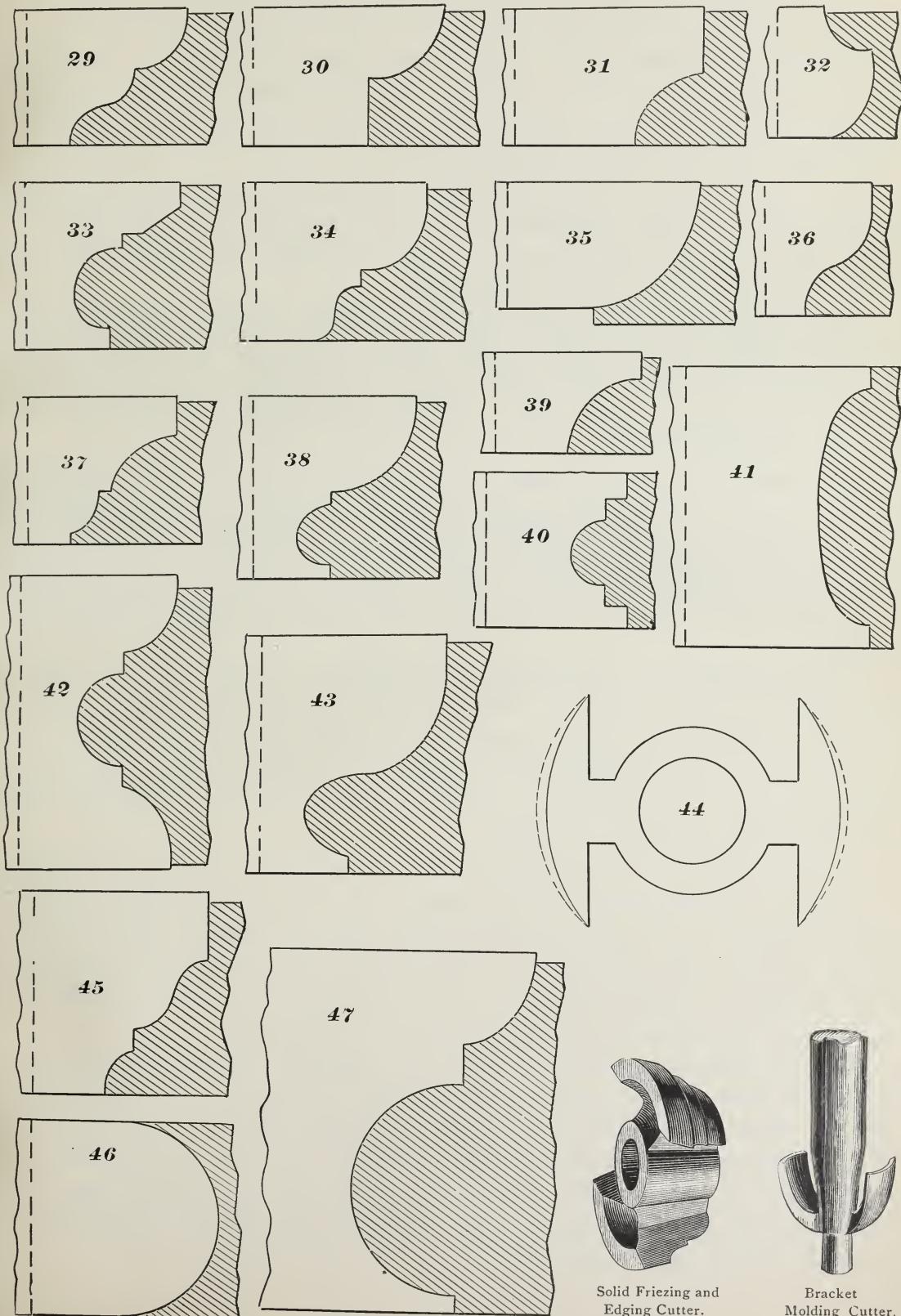


Carving, Penciling, Tracing, and Surface Ornamenting Tools.



Edge Molding and Friezing Cutters.

These cutters are made from forged steel, turned to shape in such a manner as to secure abundance of clearance. They have sharp cutting edges, will work in either direction, and not burn or tear the wood. Any special form of cutter wanted can be quickly furnished by sending a drawing or piece of the molding desired.



Solid Friezing and
Edging Cutter.

Bracket
Molding Cutter.

Tenoning Machines.

In the formation of tenons, various systems have been adopted according to the character of the work to be done. One of the first methods after hand labor was by a combination of circular saws at right angles to each other. Those parallel to the grain of the wood cutting the side of the tenon, those at a right angle to the grain cutting the shoulder; this is still in use, and although to some extent inaccurate in its operation, is expeditious, and may serve for some purposes.

The most popular and accurate tenoning machines are those having cutter heads revolving with their center of rotation parallel with the side of the tenon to be cut, the cutter heads being provided with saws or segments of saws to cut the shoulder of the tenon. This is the usual method for single tenons.

When two or more tenons are to be made upon a stick, a spindle is provided with a number of cutter heads revolving at right angles to the grain of the wood, the timber being passed by the cutter head, the sides of the two outer tenons with the intermediate gain or gains are cut at one operation. This system is appropriate for heavy work, and is in use for that purpose.

For double tenons or light work a combination of these two systems is sometimes found convenient. For special purposes an improved patented method is adapted, in which the piece to be tenoned is revolved against a revolving cutter head, or the cutter head is carried around the piece to be tenoned. This last system is confined to round or oval tenons, and is used for tenoning blind slats, spokes for wheels, or any similar operations.

Blind slat tenoners are indispensable to manufacturers of blinds, as will be found in the descriptions of these machines. They are made to feed by hand or power. The oval Tenoning Machine is used almost exclusively for tenoning spokes after they are driven into the hub, and are essential for the construction of first-class wheels. The system of cutting round tenons is patented by us, and the construction of such machines by others is an infringement and will be so treated.

In the construction of Tenoning Machines the majority are of the class with the revolving cutter heads parallel with the grain of the wood, and are adapted to general uses in all kinds of wood-working establishments. They are arranged with attachments for the specialties to be produced, as in the cope heads, which are for forming the reverse of the molding on the shoulder where the tenon is to be used in sash or door work; also cutting-off saws are attached for cutting tenons to a correct length.

Car manufacturing requires heavy tools in its construction, and we have produced for the purpose some large car tenoners which are found to operate in the most satisfactory manner. These are constructed on the system of parallel cutters for single tenons with an intermediate head attachment, the head revolving in the same manner, it being the same diameter as the thickness of the gain to be cut, and also with the cutter heads revolving at right angles to the grain of the wood, and so arranged as to cut a tenon at each end of a long timber without reversal.

Any kind of tenons in common use can be cut with these machines with great accuracy and speed, and with the combinations and attachments they are adaptable to the requirements of car builders, cabinet, and carriage makers, etc. In classifying these machines, each business is separately considered and provided for, as will be seen in the description in the following pages, viz:

We make six sizes of tenoning machines for regular work, as follows.

No. 0, with swinging carriage, designed especially for spoke and carriage work and general light tenoning requiring short tenons and quick carriage movement.

No. 1, with carriage working on slides, and narrow heads, adapted to the general requirements of cabinet and carriage makers. When desired for spoke work, a special carriage, with gauge, etc., is fitted.

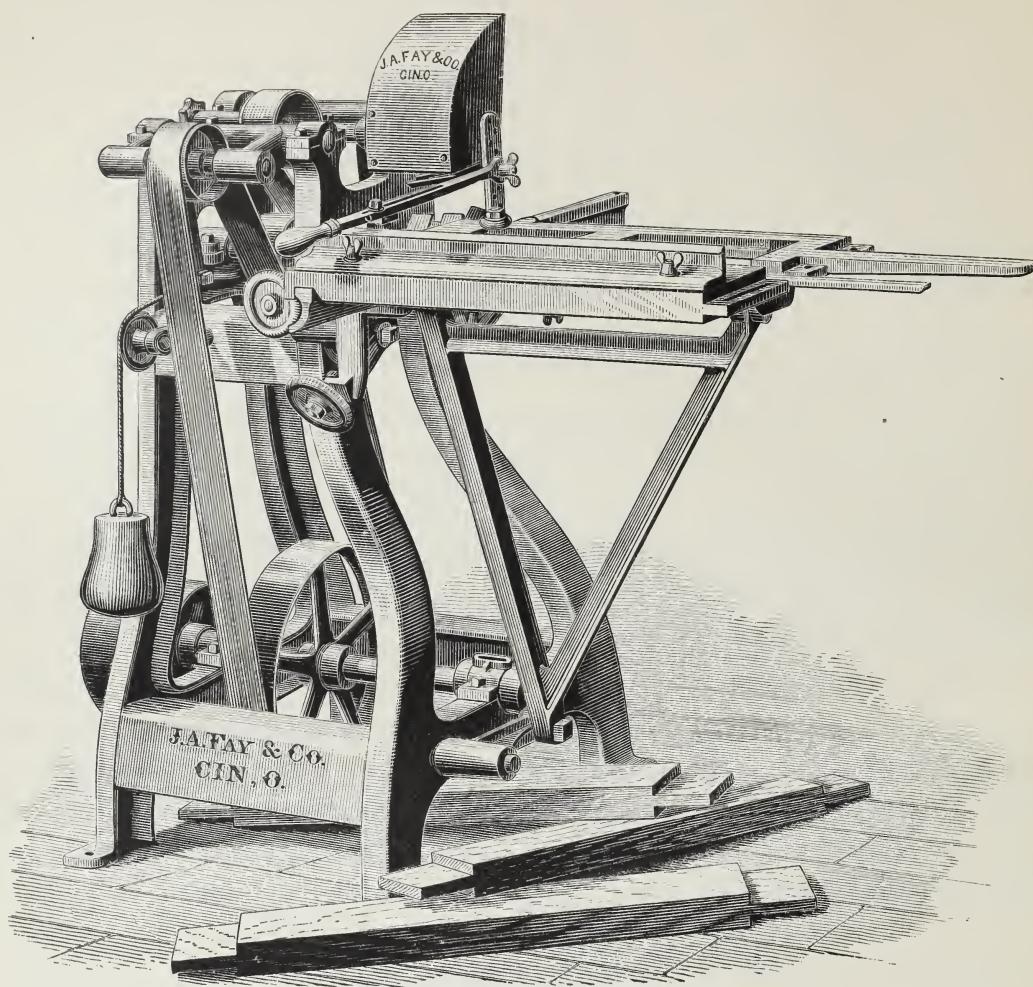
No. 2, small size, with upper and lower copes, for sashes, blinds, and light door work.

No. 3, medium size, with wide cutting heads, for working tenons up to six inches, with upper and lower copes, for doors, and all general work, heavy and light.

No. 4, large size, for car, bridge, and heavy work, capable of working twelve-inch timber. We furnish with this, an attachment for cutting double tenons on car sills, etc., when wanted; also, an attachment for gaining.

No. 5, vertical car tenoning machine, for cutting long car and bridge sills, etc.

A more extended description will be found with the illustrations on the following pages. They are all put in working order, thoroughly tested and tried before being sent out. We are in receipt of the highest testimonials from hundreds using these machines, not only of the accuracy and superiority of the work produced, but of their superior labor saving advantages.



NO. 0
Spoke and Cabinet Tenoning Machine.

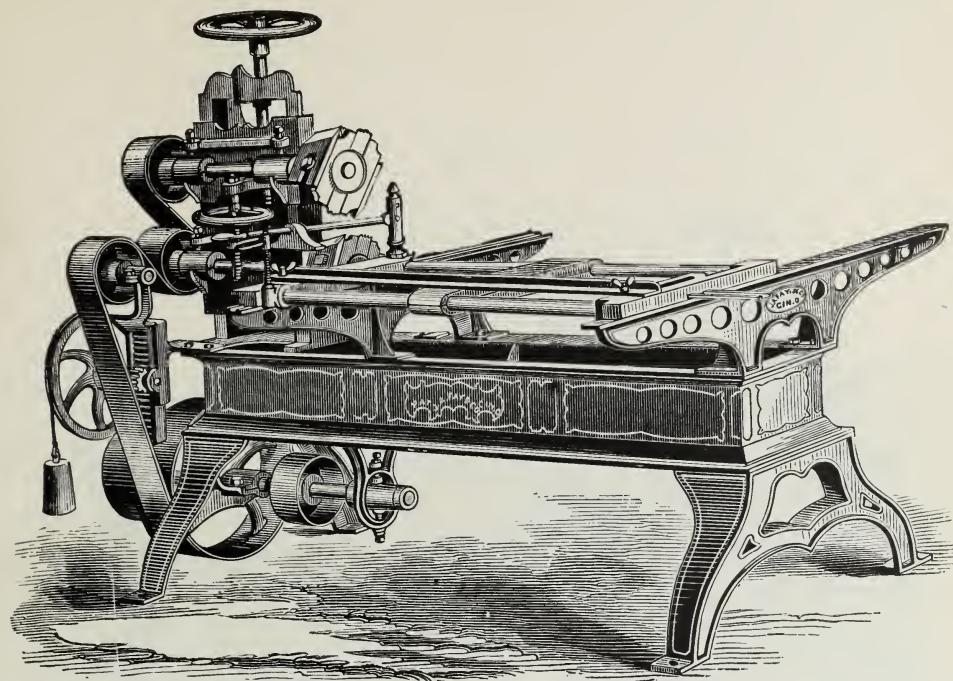
This is a new machine intended for tenoning spokes and light work in wagon, cabinet, or other manufactories; it is substantial in all its parts, and the adjustments are so easily and quickly made it is a favorite wherever used.

The lower head is stationary in boxes cast in the frame, the table lowering on inclines by a hand-wheel in front to regulate the depth of the cut on the under side. The upper cutter head is adjusted to regulate the thickness of the tenon by a hand-wheel in front connected to the cutter head frame. Provision is made for lateral adjustment, for cutting the shoulders of uneven lengths if desired, or for adjusting accurately.

The table is planed to fit on an angled gib, and can not rise from its place while being operated; as it is also clear of the frame the operator has an opportunity to keep close to his work. The table is supplied with hold down lever, fence, stops, and stop bar, and for cabinet work has an end extension, as shown in the engraving.

There are two styles of tables for this machine: one narrow, for spoke work, the other wide, for cabinet work. Both heads are run by one belt, the tension of which is regulated by a self-adjusting idler pulley on a frame operated by a weight, the belt accommodating itself to the distance the heads may be apart.

It has the patent tight and loose pulleys which are eight inches in diameter and three-inch face, and should make 950 revolutions per minute.



NO. 1

Small Size Tenoning Machine.

(FOR CABINET AND SPOKE WORK.)

This machine is particularly well adapted for furniture and cabinet work, or almost any kind of tenoning within its capacity, where copes are not required. It is simple, substantial, and durable.

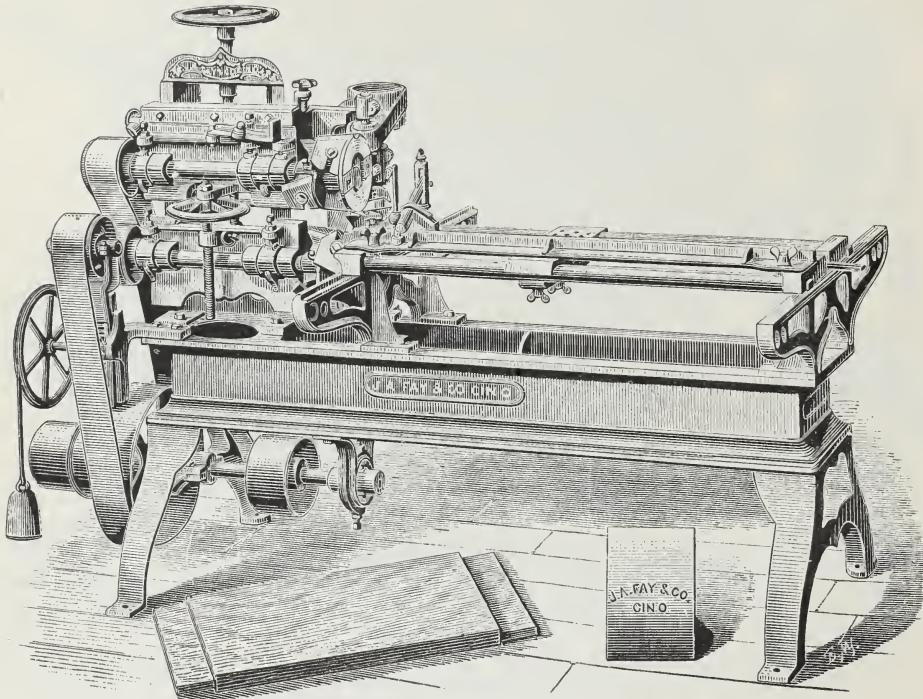
Both cutter heads raise and lower simultaneously, or independently, by a screw to each, operated by a hand-wheel, and are easily adjusted, so as to vary the thickness of the tenon or the depth of the shoulder, as may be required, the carriage always remaining stationary. It is provided with narrow cutter-heads; the arbors are made of steel and run in patent self-lubricating boxes. The upper head has a lateral movement over the lower head, so as to cut one shoulder of tenons longer than the other, when desired.

The carriage is partly made of wrought-iron tubes, consequently is very light and worked with great ease. It is provided with all the necessary stops, extension rods, etc.

The belt pulleys are large and at the end of the machine, out of the way of the operator. The main belt, which drives the cutter-head shafts, when once laced never requires alteration, as a self-adjusting binding pulley acts against the loose side of it, by a weight and pulley always keeping it tight.

When the machine is desired for spoke tenoning, it is fitted with a light adjustable attachment on the carriage, for grasping the spoke; also, a saw for cutting off the spoke to the proper length the same instant it is tenoned may be added at a small expense.

The countershaft is supplied with the patent tight and loose pulleys, which are eight inches in diameter and three-inch face, and should make 950 revolutions per minute.



NO. 2

Patent Sash and Door Tenoning Machine.

(WITH SINGLE CUTTERS AND DOUBLE COPIES.)

Both upper and lower heads have a simultaneous vertical adjustment. The upper head has also an independent lateral adjustment for varying the length of the tenons. The coping heads are adjusted vertically with the tenon heads

NO. 2

Patent Sash and Door Tenoning Machine.

(WITH SINGLE CUTTERS AND DOUBLE COPIES.)

This machine is designed for the use of sash, blind, and door manufacturers, or works in which a corresponding class of work is done. It is well built, remarkably simple, and adapted to the requirements of small factories for sash and light doors.

The heads are single, but so placed on their frames that a tenon can be made double the length of the cutter by passing the stuff through twice. The knives are placed at an angle on the heads which gives a shearing cutting edge, making the work very smooth.

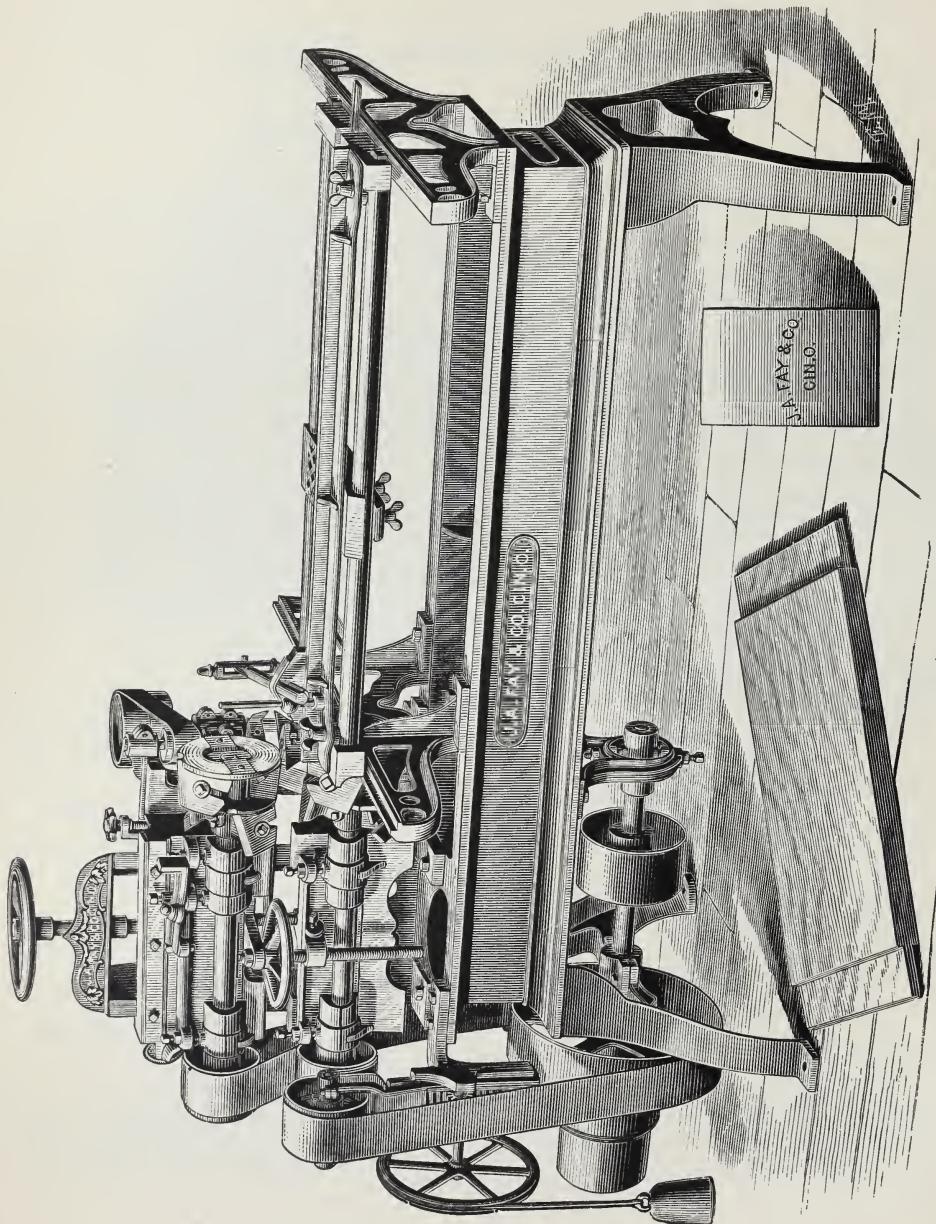
The gateways that carry the cutter-head spindles are gibbed to a vertical slide and are raised together or separately, as may be desired, one screw raising both frames, which governs the thickness of the lower shoulder. The other screw separates the heads and regulates the thickness of the tenon. The screws are furnished with locking devices to prevent any vibration.

The arbors are steel and run in patent self-lubricating bearings. The upper one is adjustable for scribing the shoulders accurately, or making one shoulder longer than the other.

The machine is constructed with one or two coping heads, or without, as may be desired. The cope heads have independent adjustment, and are attached to the cutter-head frames.

The belt pulleys are at the end of the machine, out of the way of the operator. The belt is graduated in its length by an idler pulley, kept in place by a weight acting on a pinion and rack. The carriage is light, runs on rollers at one end, is worked with ease, and is provided with stops, extension rod, holding-down lever, etc., etc.

The countershaft is attached to the machine, and is furnished with our patent tight and loose pulleys, which are eight inches in diameter and three-inch face, and should make 950 revolutions per minute.



N.O. 3

Patent Door and Sash Tenoning Machine.

(WITH DOUBLE CUTTERS AND COPIES.)

NO. 3

Patent Door and Sash Tenoning Machine.

(WITH DOUBLE CUTTERS AND IMPROVED COPIES.)

This popular labor-saving machine has been recently improved, embracing important features, which actual use and long experience have shown to be requisite, and which are found only on the J. A. Fay & Co. Patent Tenoning Machine. It is undoubtedly the best door and sash tenoning machine now in use, and is strongly recommended for all general work in house building, carpentry, etc.

It will cut tenons from one-quarter to six inches long of any thickness required. Larger tenons than six inches are made by running through a second time. The upper and lower cutter heads raise and lower by a screw to each operated by a hand wheel, and are readily adjustable, so as to vary the thickness of the tenon, or the depth of the shoulder, as may be required, (the carriage always remaining stationary) and has a lock attachment to firmly secure them in any position they may be set.

The carriage is of peculiar construction, runs on rollers at one end, is worked with great ease, and is provided with all the necessary stops, etc. Each cope is attached to the gateway, in which the cutter head hangs, so that they can raise and lower with the cutter-heads and need no separate setting, while they are so arranged that they can be adjusted independently of the cutter-heads if desired.

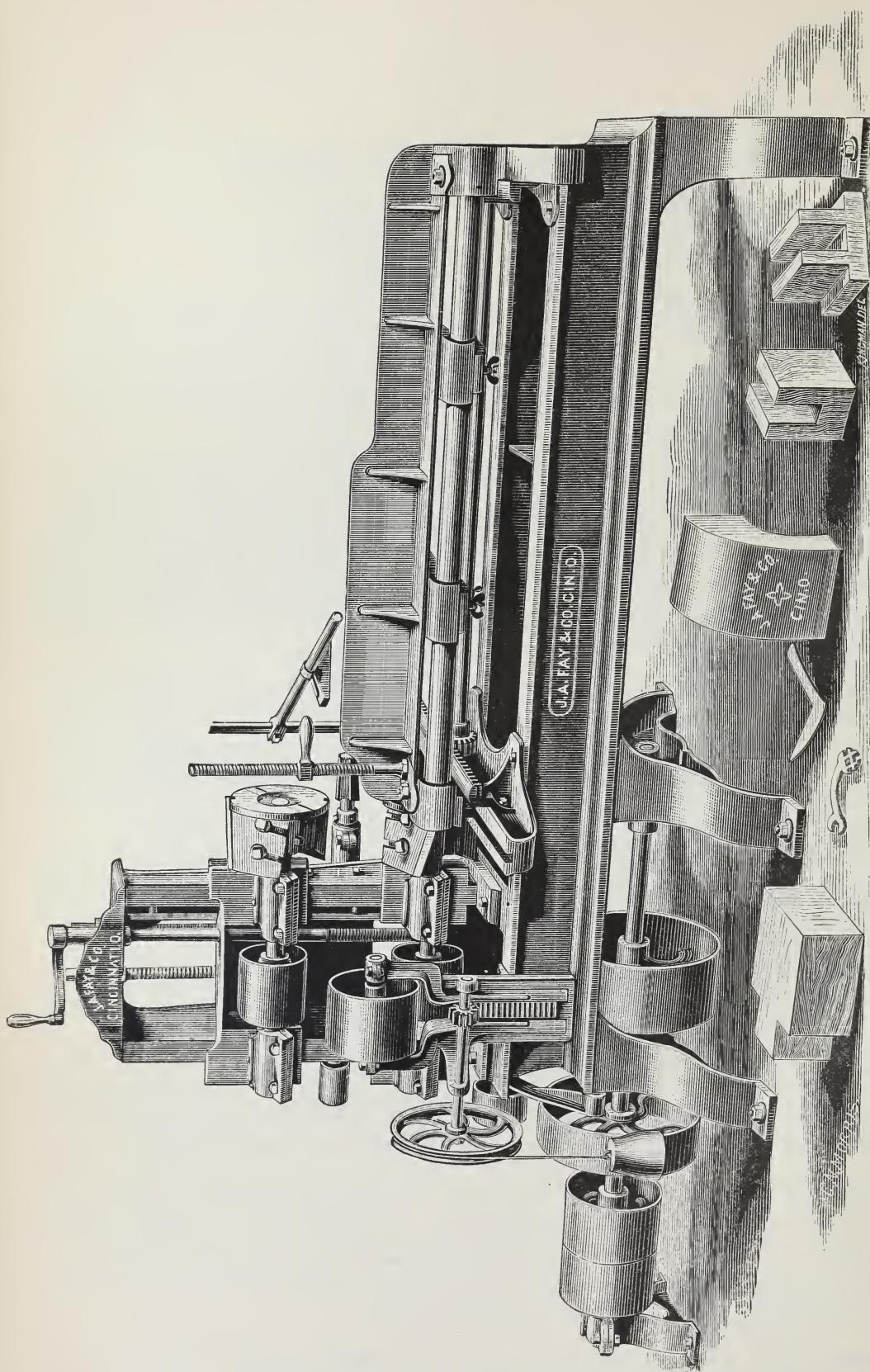
Each cutter-head shaft has a peculiar arrangement, which prevents all vibrations end-wise, and both run in long patent self-lubricating bearings, arranged so as to constantly flood the journals with oil.

The upper cutter-head is arranged so as to cut one shoulder of tenons longer than the other if desired. The copies move out and in with single screws, saw spurs are used instead of "knife spurs," requiring less sharpening, and are easier kept in order.

Owing to the shape and peculiar position of the cutters, a drawing-stroke or cut is obtained, whereby they cut very easily and smooth; the bonnet is attached so it can be swung back out of the way, making it convenient to get at the cutters to sharpen.

The belt which drives the cutter-head arbors is out of the way of the operator, and when once laced together requires no alteration, as a "binding pulley" operates against the loose side of it by a weight and pulley, which keeps the belt tight and self-adjusting. As the belt covers nearly the whole surface of the pulley, the speed of the cutter-heads cannot be checked while doing any kind of work required.

The patent tight and loose pulleys accompany this machine, and are eight inches in diameter and four-inch face, and should make 830 revolutions per minute.



No. 4 Large Patent Car Tenoning Machine.

(WITH SIMULTANEOUS AND INDEPENDENT VERTICAL ADJUSTMENT OF CUTTER-HEADS,
ATTACHMENT FOR DOUBLE TENONS, WROUGHT-IRON TABLE, ETC.)

NO. 4

Large Patent Car Tenoning Machine.

(WITH SIMULTANEOUS AND INDEPENDENT VERTICAL ADJUSTMENT OF CUTTER-HEADS,
ATTACHMENT FOR DOUBLE TENONS, WROUGHT-IRON TABLES, ETC.)

This is a very powerful machine, designed for the heaviest requirements of car and bridge building, railroad shops, etc. It is made especially heavy, and is in every respect fully equal to the service it is designed to perform.

The table is low, to economize labor in lifting the timbers to be tenoned. The cutter-heads are of large diameter, with double spurs, and are adjusted independently by a screw to each, so that they can be made to cut a tenon of any thickness with any proportion of shoulders within the capacity of the machine. The extreme range being to cut tenons twelve inches long on fourteen-inch timbers.

The back of the upright stand carries a head for gaining a double tenon to four inches in length. This is raised by a screw, and can be moved out of the range of single tenoning.

The side of the upright stand has a movable piece, which, when taken out, makes the whole length of tenon twelve inches, or gaining may be done for car trucks or parts in which the gains are twelve inches or less from the ends.

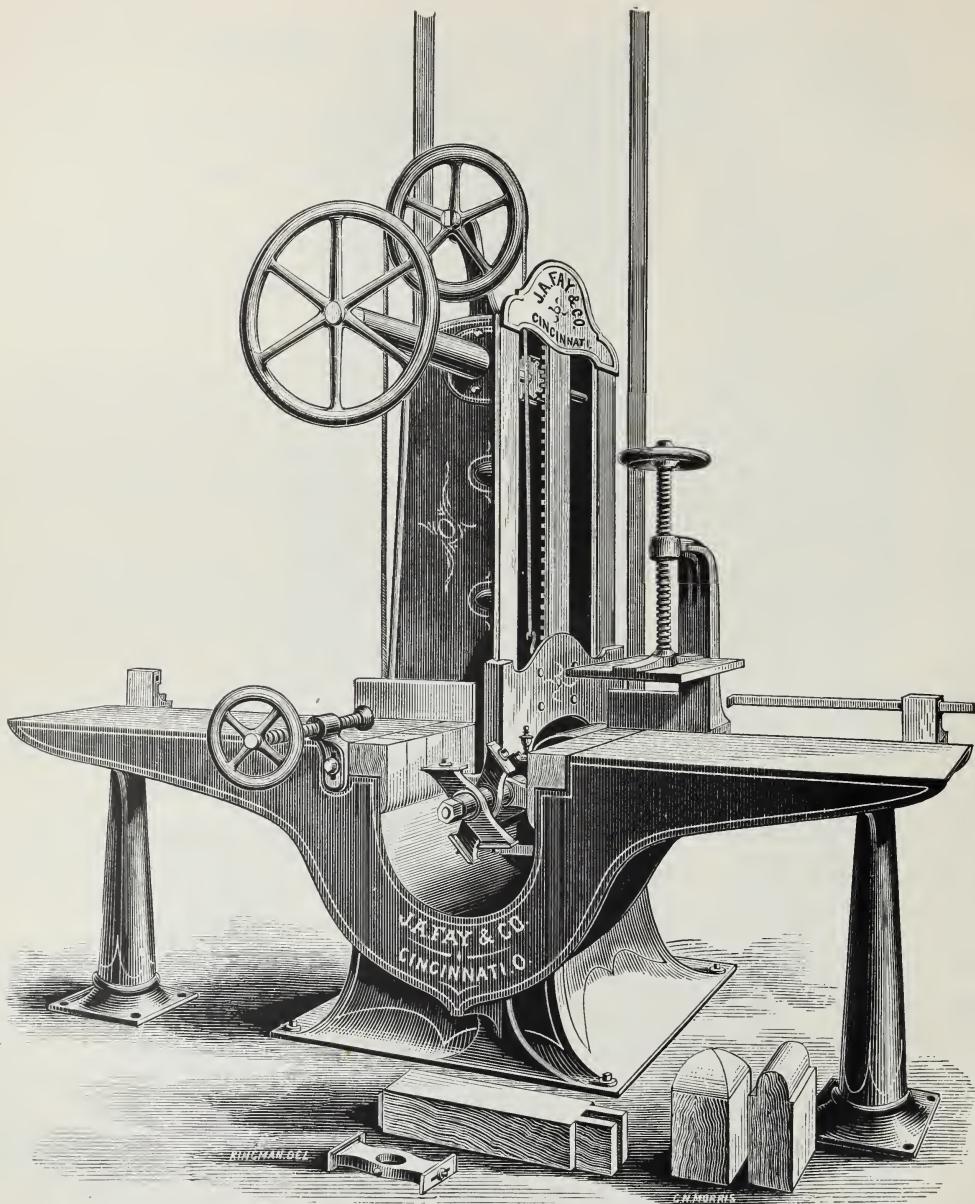
The belt which drives the heads is retained at its proper tension by a sheave and weight in connection with a binder pulley, which compensates for any motion of the head up or down.

The table is placed upon friction rollers which run on planed ways, one of which has a groove in which is fitted a corresponding tongue on the table to keep it at a constant right line with the line of the head.

It is also provided with stops and gauges which can be set to suit pieces of various lengths, and has an adjustable fence and rod for holding the timbers securely in position, which is instantly fixed and released.

The heads are provided with an adjustment to make the shoulders perfectly square or out of square, as may be desired. All parts of the machine are convenient to the operator, the lubricating arrangements are perfected for an economical use of oil, and the entire machine will be found finished in a workmanlike manner.

The patent tight and loose pulleys furnished with this machine are ten inches in diameter and six-inch face, and should make 900 revolutions per minute.



Patent Vertical Car Tenoning Machine.

FOR CUTTING

Single, Double, and Triple tenons, cornering, etc. Tenons can be cut on both ends of car sills from one face, without turning.

Patent Vertical Car Tenoning Machine.

FOR MAKING

SINGLE, DOUBLE, AND TRIPLE TENONS, ROUNDING, CORNERING, ETC.

In cutting the tenons on car sills, it is desirable to complete each timber without reversal. To accomplish this result, this machine has been designed, and most successfully performs the operation of cutting single, double, or triple tenons on both ends of long timber from one face, without turning the stick end for end, by passing the stick by the machine, cutting the tenon on one end as the head passes downward on the other end as it is carried upward.

It is very heavy and substantial, built in the very best possible manner, and meets a want long felt in every establishment working timber for cars, bridge builders, etc. The amount of work that can be done with it can only be measured by the amount of material that can be presented to it.

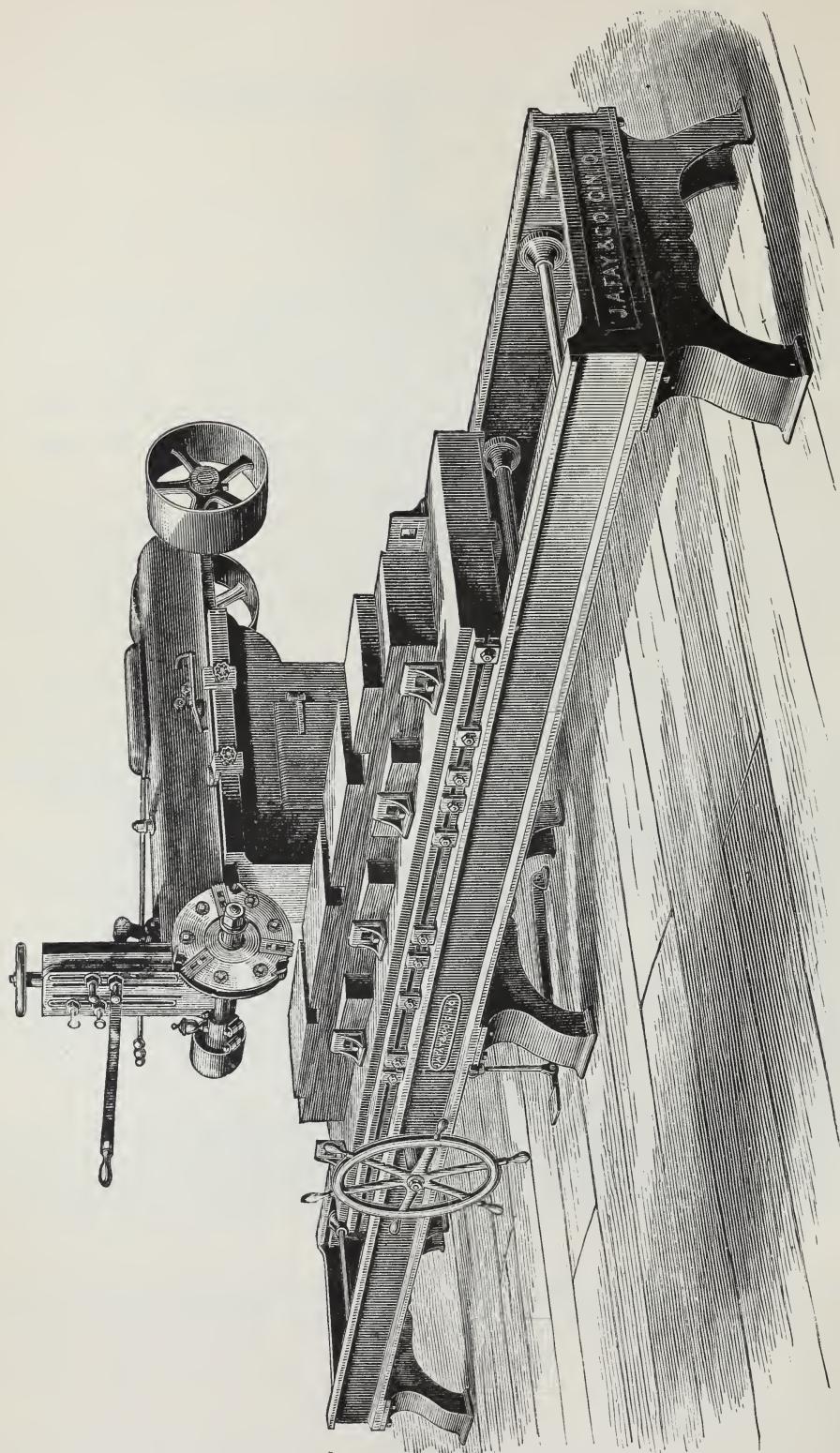
It has two iron tables in fixed positions, having a gap between them, for the passage of the heads below the surface, arranged at a convenient height for handling the timbers, with adjustable fence for the thickness of the shoulder on the face side of the timber, screws for holding down, and gauges to determine the length of tenons.

The heads are traversed vertically, on a stand, by means of a large hand wheel, the frame carrying the head being so counterbalanced as to take from the operator all the weight, either in ascending or descending. The countershaft is placed vertically over the machine, leaving the floor clear of all obstructions, the belt remaining at the same tension in whatever position the head is working. The ends of the table are faced with wood, so that the cutters may be run against them to prevent any tendency to split or tear as they pass in either direction.

The machine may be used for cornering, beveling, smoothing, rabbeting, or cutting down on the sides of timber, by fixing the head and passing the timber as in a planing machine, and the ends can be rounded or molded as well as cutting all styles of tenons upon them.

It is self-contained, will stand on any floor, requiring no braces or supports whatever; occupies but little space, as it has no horizontal belt at or near the floor. The movement of the cross-head, up or down, does not affect the tension of the belt. The cutter heads and shafts are made of steel.

The patent tight and loose pulleys are twelve inches in diameter and six-inch face, and should make 700 revolutions per minute.



Patent Car Gaining Machine.

(WITH TRAVERSING CUTTERS AND AUTOMATIC FEED.)

WILL CUT GAINS WHILE MOVING FORWARD OR BACK.

Patent Car Gaining Machine.

(WITH TRAVERSING CUTTERS AND AUTOMATIC FEED.)

Grooves cut at right angles to the fiber of timber, are termed gains in the technical language of carpentry. These gains, in the present method of erecting heavy work, especially in bridges and railroad car timbers, have heretofore been done in a great measure by hand labor, or by rotary cutter-heads projected through the surface of a table sufficient for the depth of the gain, over which the timber was traversed to complete it. These methods having been so objectional, we have been induced to generate a machine with particular reference to this class of work.

This is a very massive and substantial tool, occupying an area of ten by twenty feet on the floor. Timbers of any size to twelve inches thick by twenty-four inches wide can be gained at any desired angle to the depth of four inches. By means of the stops in front of the table, in connection with the treadle and spring-pin working through the way, duplicates of timbers may be produced indefinitely, the stops indicating the width and distance apart of the gains.

The depth of the gains is determined by the position of the stops placed in the slots in the cutter slide, which will indicate four depths of gains. The table is moved longitudinally upon friction rollers by means of a rack and pinion underneath, operated by a hand-wheel in front.

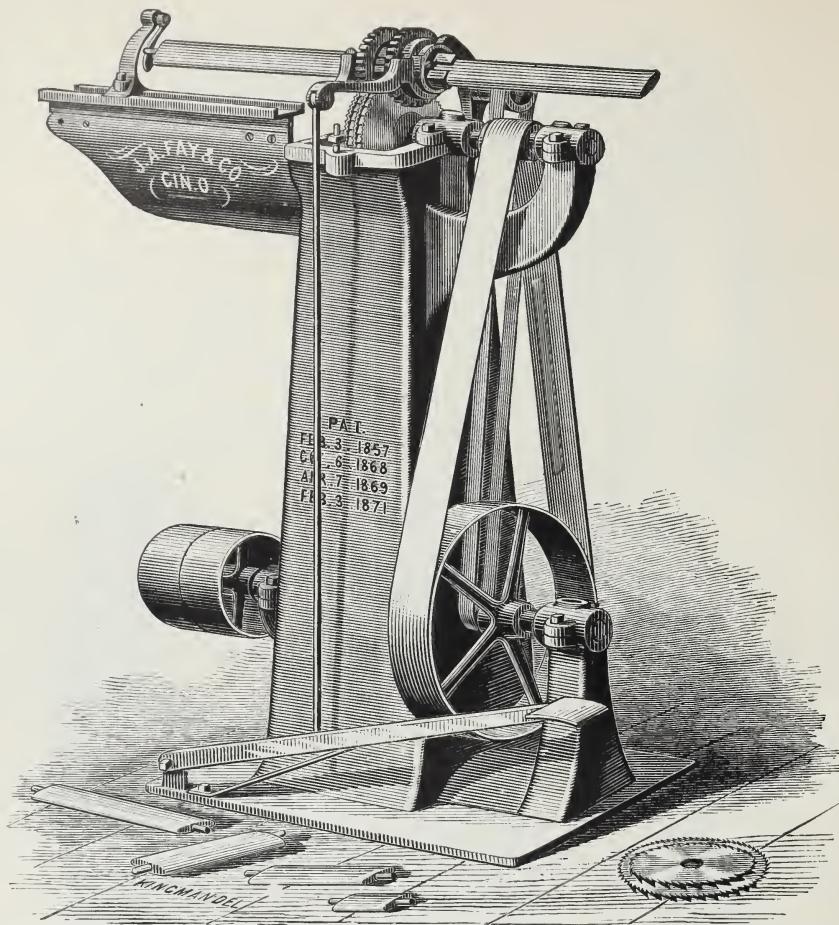
The cutter-head with its slide has a vertical movement, governed by the lever in front and counterbalanced by a combination of springs inclosed in the moving frame. The cutter-head can be quickly placed anywhere within its range of movement without changing the position of the governing hand lever.

The sliding frame, which conveys the cutter-head in its traverse movement over the table, is actuated by means of a series of gearing driving a pinion in a fixed rack, contained within the frame. It is automatic and stopped at any point by means of a shipper and adjustable stops on the side of the column, and started by the operator turning the handle under the hand lever, which engages the belt with the tight pulley.

The motion of this sliding frame is at a fixed speed, whether for wide or narrow timber, a peculiarity no other gainer possesses. This equal speed in either direction enables the cutting to be done both ways, the cutter-head being so constructed as to facilitate the operation.

The countershaft from which the machine is driven is placed vertically over the center of the distance of the travel of the pulley-shaft in the rear end of the sliding frame. The arc of the circle struck from the countershaft being but slightly different from its chord, the tension of the belt is not affected sufficiently to be any detriment to the working of the machine.

It is supplied with the patent tight and loose pulleys which are eight inches in diameter and four-inch face, and should make 584 revolutions per minute.



Patent Self-Feed Blind Slat Tenoning Machine.

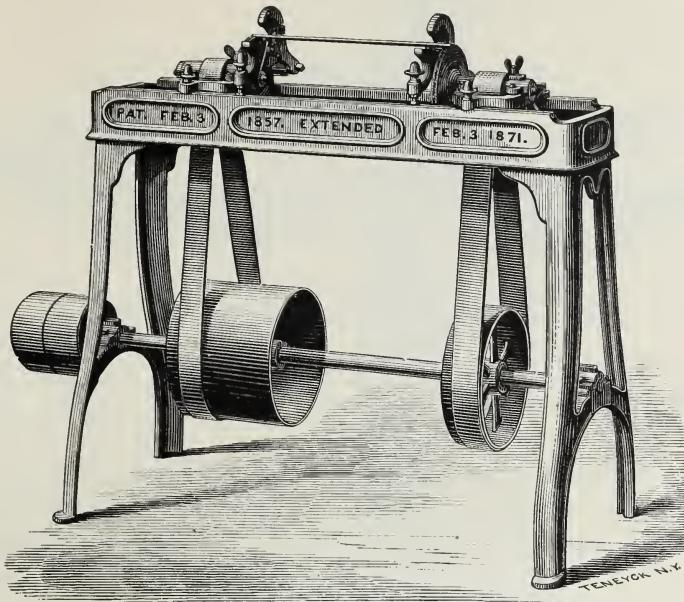
This machine is now universally conceded to be the most perfect and simple machine in use for tenoning blind slats, combining as it does all the essential elements of the Ellis and Bickford patents. It is simple in construction, and perfect in operation.

The stuff to be worked may be of any length desired, and is fed endwise through rotating chucks, the shoulder being pressed against an adjustable gauge for regulating the length of the slat. By the peculiar construction of the revolving cutting tools, two tenons are cut and divided with one cutter head simultaneously at one operation.

A pressure upon the treadle causes a rotation of the slat, and carries it against the cutting tools, forming a perfect tenon on each end; the rotation of the slat gives a true cylindrical form to the tenon, and also performs the very important function of so presenting the slat at all points that the cut may be from the periphery to the center, thereby preventing splitting or tearing of the wood.

By releasing the treadle, the chucks are instantly stopped in order that the slat may be fed to the gauge, as the driving belt at the same instant is slackened so as to slip and not drive. It will work any length of slat from one and three-fourths up to four inches, and will form any size of tenon desired.

Any boy of ten years can operate it, and any ordinary mechanic can keep it in perfect order, owing to its simplicity. It has the patent tight and loose pulleys, which are six inches in diameter and three-inch face, and should make 600 revolutions per minute.



Ellis' Patent Blind Slat Tenoning Machine.

(HAND FEED.)

This machine is conceded to be the most simple and perfect machine now in use for making cylindrical tenons on all kinds of rolling blind slats, and has almost entirely superseded every other machine for this purpose.

It is adapted to different lengths and widths of slats, cutting the shoulder and rounding the tenon upon both ends simultaneously at one and the same operation in the most rapid and perfect manner.

This is accomplished by means of two arbors and frames, both adjustable relatively to each other, each carrying a set of circular saws for forming the shoulder and rounding the tenon.

Attached to the above frames are two revolving disc guides, slotted through their diameters to receive the blind slats and conduct them to the saws during the operation of cutting.

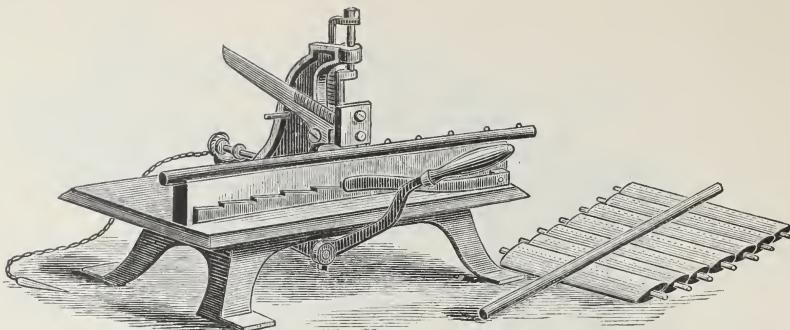
The rotation of the slat brings the saws into contact at each of its extremities, causing it to cut towards or in the direction of the center of the slat as they strike the wood, making a clean cut and forming a perfectly cylindrical tenon.

The cut being always from the periphery to the center, no tearing or splintering of the work is possible. It is quickly adapted to work long or short slats, and the size of the tenon can be varied to suit different widths and sizes.

By a simple and ingenious lock attachment the disc guides and arbor frames are securely retained in any desired position without possibility of disarrangement.

This machine is ready for use the moment placed in position and belted, and is capable of working twenty thousand slats per day with ease.

It is supplied with our patent tight and loose pulleys, which are six inches in diameter and three-inch face, and should make 600 revolutions per minute.

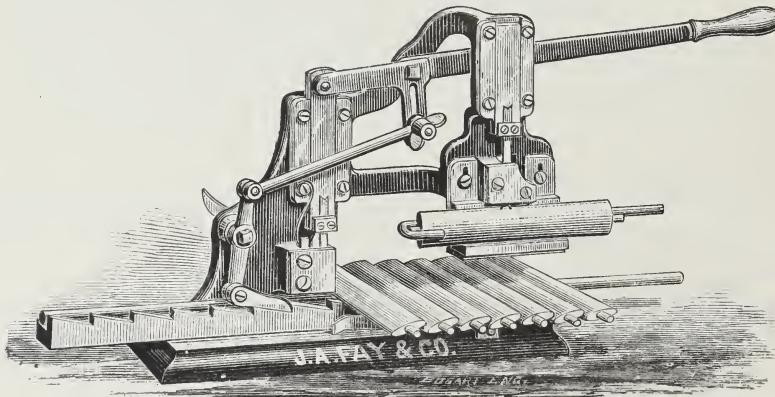


No. 1 Patent Bench Blind Wirer.

This is a very simple and effective machine for wiring rods and shades of window blinds, and attaching them together. It is worked by hand and can be secured to a bench in any part of the shop.

The peculiarity of this machine is, that it will drive staples from $\frac{3}{8}$ to $\frac{5}{8}$ of an inch in length, in either rod or slat with perfect exactness. It is so constructed that only a single staple can be fed at each motion of the lever. There is consequently no danger of clogging.

It is quickly varied to set staples at different distances by means of a suitable spaced notched rack. The staple driver is made of a strip of steel, and when worn or broken can be renewed for ten cents.



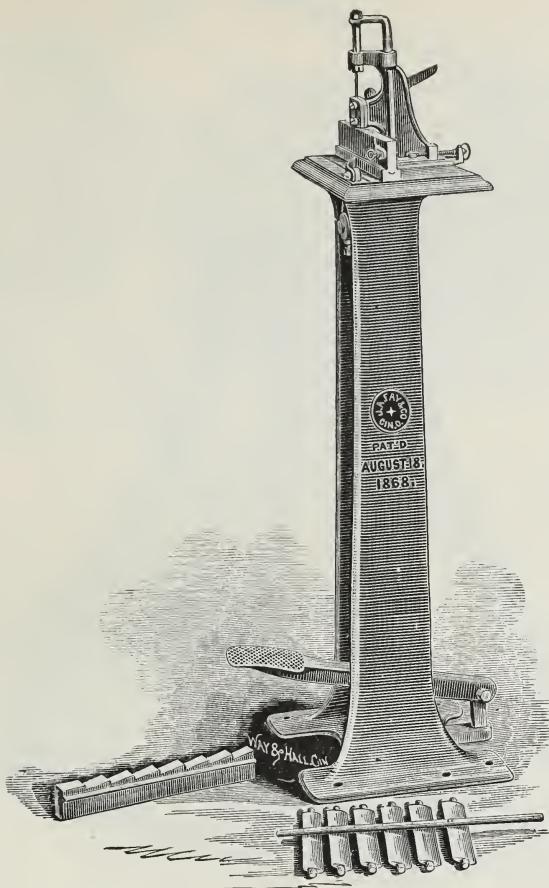
Patent Double Blind Wirer.

This is an improved automatic machine, both for feeding the staples and spacing the rods, and is believed to be superior to any thing heretofore devised for this purpose. The working parts are all made of steel and hardened. The drivers are made so that in case of breakage or wear they can be renewed for a few cents.

By this machine both the slat and the rod are wired together; the slat being wired by the upper and the rod and slat wired together by the lower driver, both working by one movement of the hand lever.

It is arranged with a cut-off or improved feeding devise which entirely prevents more than one staple to be driven at a time.

The carrier or notched rack is made of wood and can be varied to suit the different distances desired to set the staples in the rod. It works with the greatest rapidity, is perfect in every detail, and gives general satisfaction.



NO. 2

Patent Pedestal Blind Wirer.

This machine is constructed on the same general principle as the Bench Blind Wiring Machine, illustrated and described on the opposite page, which consists of guides for conducting the staple to the rod; a device for feeding the staples between the guides; a driver for forcing them into the rod, and a device for moving the rod forward any required distance, as each staple is driven.

It is mounted on a substantial iron column, and worked by foot, leaving the operator free with both hands to manipulate his work.

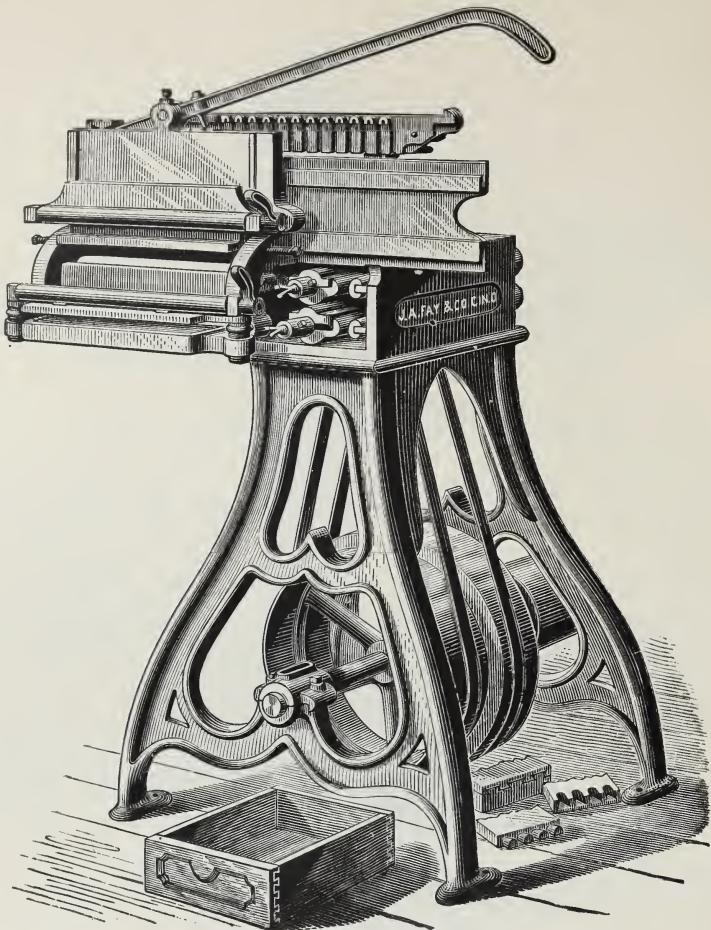
The feed travels parallel with the top of the platen, and can be varied to set staples at different distances apart. The staple driver is made of a piece of hardened steel, so that in case of breakage or when worn, can be easily replaced.

In wiring or stapling the slats the feed bolt or spacing device is thrown out of position and not used.

In wiring the rod, or the slat on the rod, the slats are placed in a wood carrier, with a properly notched gauge formed on the under side, moving one space at each motion of the machine.

It has an improved device for feeding the staples to the driver, which entirely prevents the possibility of more than one staple being driven at a time. It is easily worked and kept in order, and much liked wherever used. The staples are driven with perfect accuracy in either the rod or slat separately or to connect them together.

It is not liable to disarrangement, and will space off, set, and drive at the rate of eighty staples per minute in the very best manner.



Stengel's Patent Dovetailing Machine.

This is an entirely new and simple dovetailing machine, adapted to all the requirements of cabinet makers, carpenters, house builders, etc., designed to meet the objections which are urged with more or less justice against other machines.

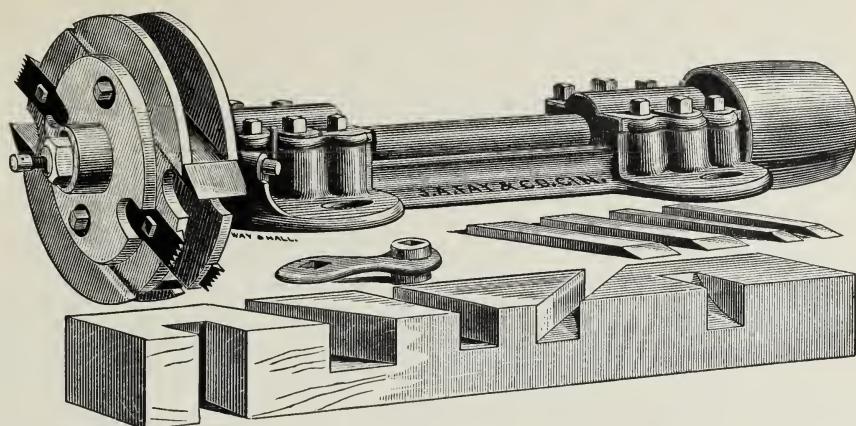
It will cut a perfect and beautiful dovetail on any kind or thickness of material up to one and one-quarter inches thick and fourteen inches wide, on both side and front at the same operation. On narrow drawers two sides and two fronts can be worked at the same time with unerring accuracy and wonderful rapidity. The countershaft is placed in the center of the machine and carries cone pulleys, which convey the power to the spindles.

The cutter spindle frames are stationary, the material being placed on a vertical and horizontal plate and held in position by cam rollers, the male part of the dovetail being cut on the piece on the horizontal table, and the female mortise or dovetail cut on the piece held on the vertical table.

The operation is performed by the movement of the hand lever up and down, the slide moving forward at each alternate motion of the lever. The construction of the guides is such that, after the machine is started, it can not be moved backward in the least nor forward more than the one notch desired, it being an actual impossibility to spoil any material after the operation is properly commenced.

The cutter spindles revolve at high speed in long bearings, and can be adjusted laterally to suit the depth of the cut. The cutters are of the most simple kind, and provision made to compensate for wear. This machine is capable of making any size or variety of dovetail, is thoroughly built, and easily kept in order.

It is supplied with our patent tight and loose pulleys which are six inches in diameter and three-inch face, and should make 700 revolutions per minute.



Expansion Groover Head and Arbor.

The above is a correct illustration of our improved expansion groover heads with cutters in slots, and compressed by means of bolts. They are remarkably simple in construction and perfect in operation. They are made of two sizes intended to be used on any ordinary saw arbor by leaving off the outside collar.

The No. 1 is seven and one-quarter inches in diameter on the cutting edge, and will expand from one-half to two inches. The No. 2 is eight and one-half inches in diameter on the cutting edge, and will expand from five-eighths to two inches.

Solid Expansion Groover Heads

FOR UNIVERSAL AND VARIETY WOOD-WORKERS.

These are special heads designed to be used only upon our wood-workers. They are so constructed that, without removal or change of cutters, they will expand to double their width, and, owing to their peculiar construction, can be made to cut any width of gain from one-half inch to seven inches in width.

WE MAKE THE FOLLOWING SIZES:

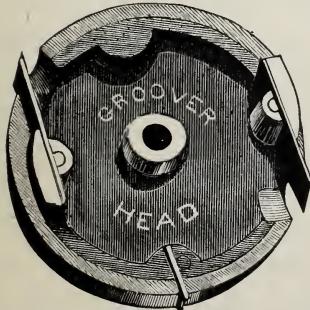
No. 3 to work from $\frac{1}{2}$ inch to 1 inch.		No. 6 . to work from 2 inch to 4 inch.
" 4 " " $\frac{7}{8}$ " $1\frac{3}{4}$ "		" 7 . " $3\frac{1}{2}$ " 7 "
" 5 " " $1\frac{1}{2}$ " 3 "		Also solid gaining heads $\frac{1}{2}$ in. and $\frac{5}{8}$ in. each.

Plain Groover Head and Cutters.

This is the common plain groover head, used for cutting gains or grooves in window frames, door stuff, plank, etc.

The cutters are furnished with spurs, and held in slots by tapered compression bolts. They can be fitted to any saw arbor, and are furnished with cutters, from one-quarter inch to five-eighths and from three-fourths to one and one-half inches wide, according to the size of the head.

We make two sizes: No. 1, with cutters to work from one-quarter to five-eighths inch wide; No. 2, with cutters to work from three-fourths to one and one-half inches wide.



Power Mortising Machines.

The Power Mortising Machine forms an exception among wood-working tools, as it is the only machine that performs its work by positive and intermittent blows. In other machines, when the resistance is too great, the belts yield and no damage occurs, but with the mortiser all parts must be so proportioned and constructed as to preclude any possibility of breaking from jar or concussion. The chisel bar movement is dissimilar in different machines, and may be classed as follows:

1st. Machines having a fixed position of the eccentric shaft, with a positive and continuous motion of the chisel bar, where the wood has to be raised or brought to the chisel to receive its action. These machines have a great advantage in the simplicity of their construction, and the high speed at which they may be run, and are well adapted to light work, such as door, sash, blind, and furniture mortising.

2d. Machines in which the mortise is formed by a revolving traversing augur or bit, so constructed as to cut on the side as well as on the end. These machines are extensively used for chair and special work, where many pieces are required to be duplicated.

3d. Machines in which the eccentric shaft, with the reciprocating parts, are all moved to the work. The objections to this class of machines are, that the force of the blow falls equally upon the chisel bar and the treadle of the operator, except as neutralized by the inertia of the crank wheel and attachments. This class of machines are best adapted to quick motion and light work, and are unsuited to heavy mortising with slow motion.

4th. Machines where the stroke is produced by a variable eccentric increasing or diminishing the throw of the chisel bar in both directions. This class of machines require a stroke twice the depth of the mortise, with the clearance added, which gives a long motion to the reciprocating parts. This limits the speed of the machine, and causes unnecessary wear and vibration in the machine.

5th. The Graduated Stroke Mortising Machine, where the motion is produced by lengthening the connection from the eccentric to the chisel bar, starting from a still point.

6th. Machines where the chisel bar has a progressive downward movement to the required depth of mortise, the crank shaft and guides having a fixed position.

In selecting and adopting the principles most suitable for the different classes of work, we have been governed by the experience derived from an extensive series of experiments, the results of which have been embodied in the three classes of mortisers constructed by us, which are mentioned in the first, second, and fifth paragraphs.

The first mentioned is used for light work, as in cabinet and carpenters mortising, where the sticks are of such size as to be easily handled by the operator.

The second is entirely adapted to chair work, and its principle is the same as used on the common routing machine, and the application to that class of work.

The fifth mentioned is applied to the various classes of heavy mortising, or where the attachments to the table are too heavy to be lifted by the operator. In this class there are some recently introduced valuable improvements, among which are an automatic reverser for one class of work, and a friction slide, which takes from the foot all concussion produced by the stroke of the chisel.

The automatic reverser is placed upon all the lighter machines, and is indispensable to their successful operation.

In the descriptions attached to the illustrations, the various parts are mentioned in detail, to which we invite your attention. It will be observed that the requirements of car, bridge and ship builders, agricultural implement, wheel, coach, chair, furniture, sash, door, and blind makers have been fully anticipated.

The improvements are covered by letters patent, and comparison and competition is invited.

They are classified as follows:

Foot Mortising Machines.

Chair Mortising and Boring Machines.

No. 1 Power Sash Mortising Machines.

No. 2 Power Sash and Door Mortising Machine, straight bed.

No. 2 Power Sash and Door Mortising Machine, with carriage feed.

No. 3 Power Mortising and Boring Machine for cabinet work.

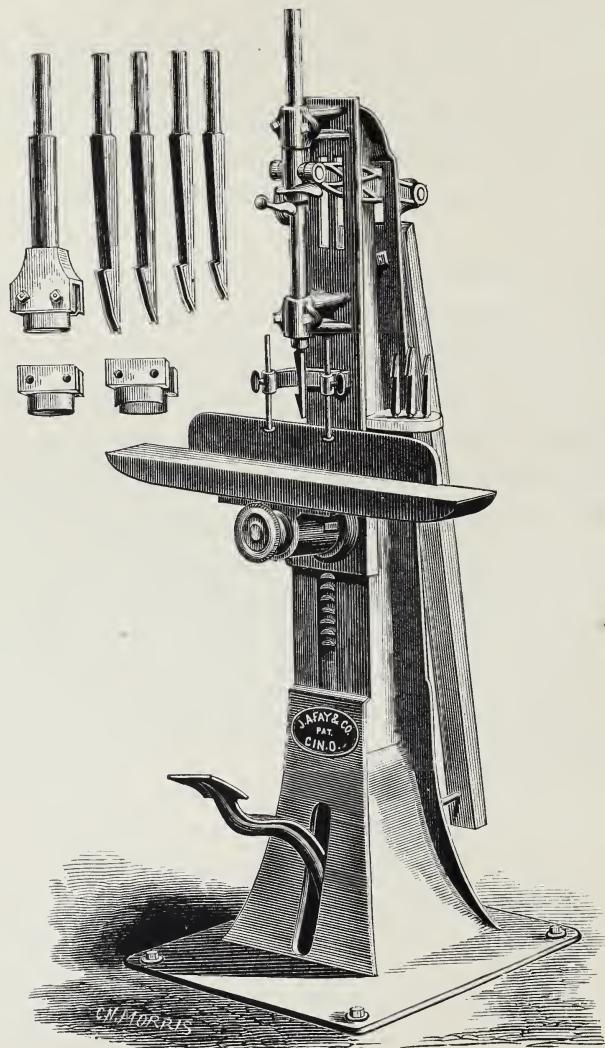
No. 3½ Power Mortising and Boring Machine for light agricultural work, etc.

No. 3½ Power Mortising and Boring Machine for light hub work.

No. 4 Power Mortising and Boring Machine for heavy agricultural and car work.

No. 4 Power Mortising and Boring Machine for heavy hub work.

No. 6 Large Car Mortising and Boring Machine with Auxiliary Boring Attachment for car and heavy bridge work.



PATENT
Prize Foot Mortising Machine.

Patent Prize Foot Mortising Machine.

This machine is made from entirely new patterns and designs, and is recommended to the attention of small builders and those who do not employ power, who require a first-class machine for all kinds of work.

It will be found not only efficient and durable, but the most powerful Foot Mortising Machine ever constructed, adapted for all kinds of mortising, where the expense of a power machine can not be afforded.

The Column is cast solid in one piece, has a broad base upon which it stands firmly in position, without securing to the floor.

The chisel mandrel is operated by means of two vibrating arms, connected by a pivot with a bent treadle, whose short member forms the lower member of a knuckle joint secured near to the bottom of the pedestal.

The treadle acts through the medium of the knuckle with a powerfully increasing purchase or leverage as the chisel passes downward into the stuff and the spring reaching its greatest tensional force, acts promptly to release the chisel the instant that the treadle is relieved from the pressure of the operator's foot.

The table is supported upon a bracket which is instantly made to raise or fall to take in stuff of different depths by means of the hand wheel in front operating upon a segment gear. It has all the requisite lateral and vertical movements without the necessity of using a wrench. We furnish as extra:

THE DOUBLE CHISEL FOR SASH WORK.



DOUBLE
SASH CHISEL.

It has two edges with a V shape between. It is pressed into the sash-bar a little more than half way through, when the bar is turned, and, by an impression on the opposite side, the mortise is made.

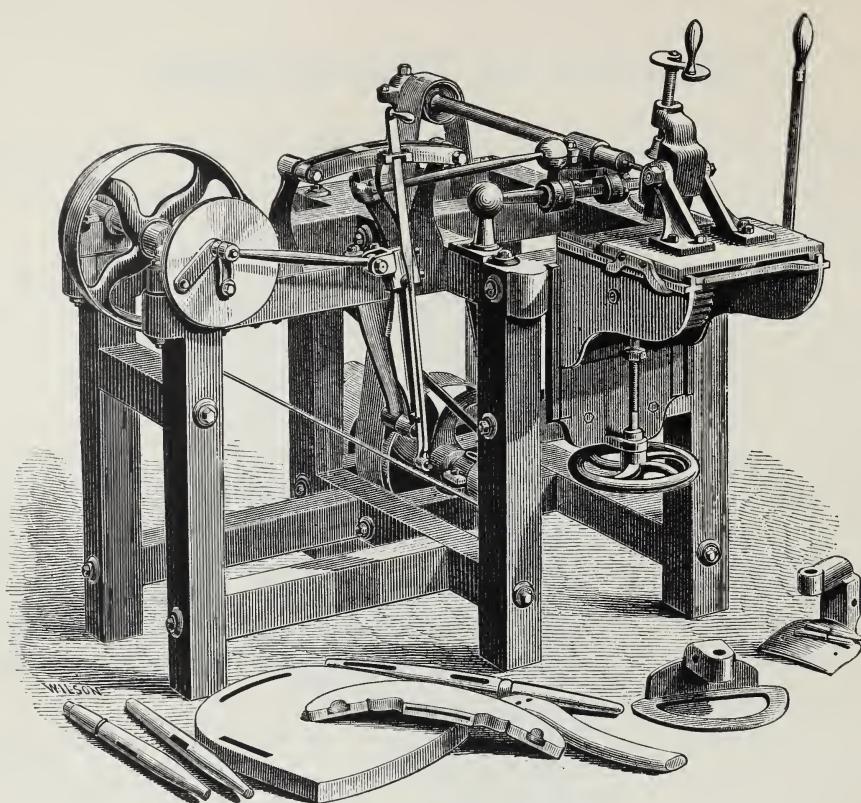
THE BLIND SLAT CHISEL



BLIND
SLAT CHISEL.

Is used for making the groove for the blind slat in the stile, the length of which being less than the width of stile and corresponding with the width of the slat. The slat enters this groove, and is by it confined in its place without moldings or brads. These Chisels we make with one, two, or three pair of cutters of such length and thickness as may be wanted.

Each machine is supplied with five chisels, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{6}$, $\frac{1}{2}$, and $\frac{5}{8}$ inch. We can furnish other sizes, from $\frac{1}{8}$ to $1\frac{1}{2}$ inches when wanted.



Lemmans' Patent Chair Mortiser and Borer.

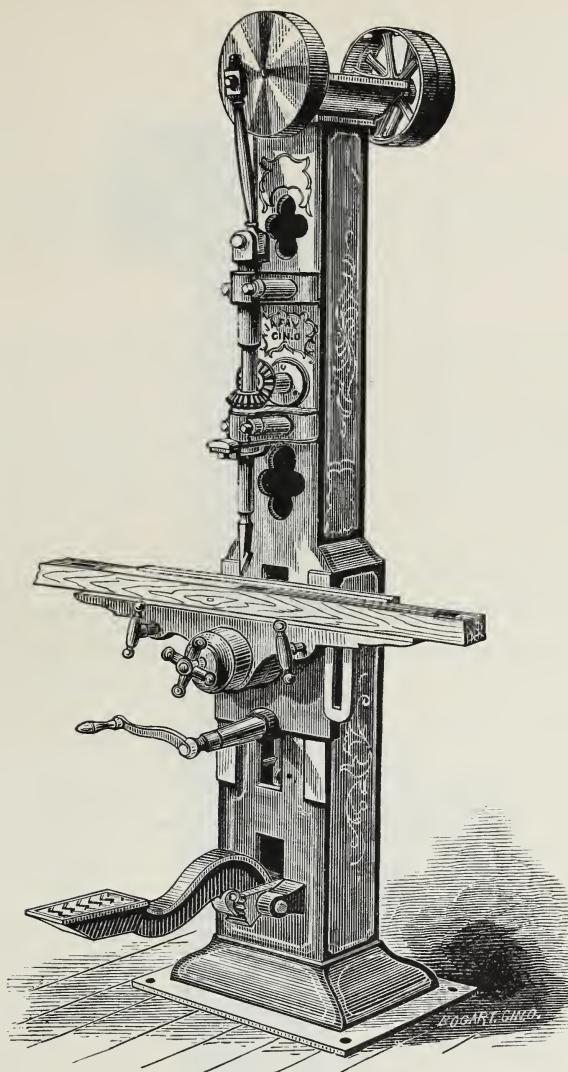
This machine is especially adapted to all the various kinds of chair mortising, either straight or curved work, without stopping the machine; and it can also be used as a horizontal boring and routering machine. The principle of the machine is rotary. The fixed end of the boring bar moves in a ball and socket joint, allowing the bar to revolve, and the vibrating end to be moved in any direction desired.

The variations from straight to mortises of different curves are produced by the position of the curved bar, upon which the bearing of the movable end of the boring bar slides; when the bar is placed with the curve horizontal the mortises are straight, and changed to its greatest curve when perpendicular.

Any length of mortise equal to the travel of the cutting bit can be made by changing the stroke of the crank pin, and also by the arrangement of a handle moving the end of the connecting rod to any position desired upon a curved rod which produces a greater or less length of the connecting rods, giving any length of mortise desired within the capacity of the machine.

The depth of the mortise is regulated by moving the table holding the stuff by a lever in connection with a pinion and rack. The table is raised vertically by a screw and hand wheel, and provided with three clamps, of different forms, for holding the stuff in the position required for the work.

It is supplied with our patent tight and loose pulleys which are eight inches in diameter, four-inch face, and should make 1,000 revolutions per minute.



NO. 1

Patent Power Sash Mortising Machine.

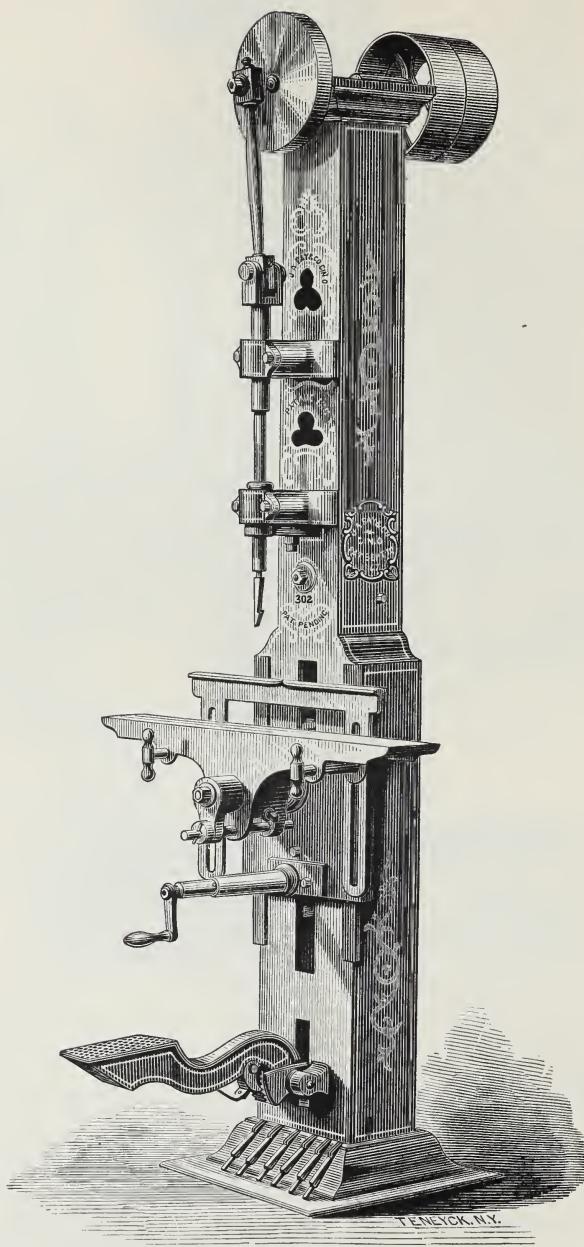
This is a new and superior machine, intended for sash, blind, and light door mortising. It is constructed wholly of steel, upon the same general principles as our No. 2 Sash and Door Power Mortiser, and combines all the improvements and advantages of that machine, excepting that it is much lighter, has a less range of work, and is intended exclusively for sash, blind, and light work, for which it has no equal.

The chisel reverses automatically while at rest or in motion, the same as on the larger machines. The bed is made to swing to any angle desired, and adjustable to suit different widths of mortising.

It has the patent compound treadle and will be found complete in every respect. It is constructed in the most substantial manner, with compensating joints, and may be run at a very much higher speed than any other sash mortisers, and without the usual jar and tremble found in other machines.

The machine is furnished with $\frac{1}{4}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, and $\frac{5}{8}$ inch mortising chisels, and is warranted superior to any sash mortiser in use.

The tight and loose pulleys are eleven inches in diameter and three-inch face, and should make 500 revolutions per minute.



NO. 2

Patent Door and Sash Power Mortiser.

WITH STRAIGHT BED,

COMPOUND TREADLE, AND AUTOMATIC CHISEL REVERSER.

NO. 2

Patent Door and Sash Power Mortising Machine.

WITH STRAIGHT BED,

COMPOUND TREADLE, AND AUTOMATIC CHISEL REVERSER.

The machine shown by the accompanying engraving is intended for mortising doors, sash, etc. It is most substantially built in every part, with a view to the work for which it is designed.

The carriage or bed on which the stuff to be mortised is placed, is stationary, the work being fed to the chisel by hand instead of being moved with the carriage, as is done on the compound bed. For light work and rapid mortising, where it is not required to clamp the stuff, this is generally preferred.

By means of the treadle, the bed is elevated so that the chisel enters the wood gradually, working in deeper and deeper at each stroke, until the desired depth is gained, thus preventing the severe concussion and jar which is certain to occur when the chisel enters the wood at full depth.

It is also arranged so as to admit of mortising at any desired height, by simply turning the crank in front. Provision is also made for relieving the bed elevating screw from danger to spring, caused by the thrust of the chisel in heavy work.

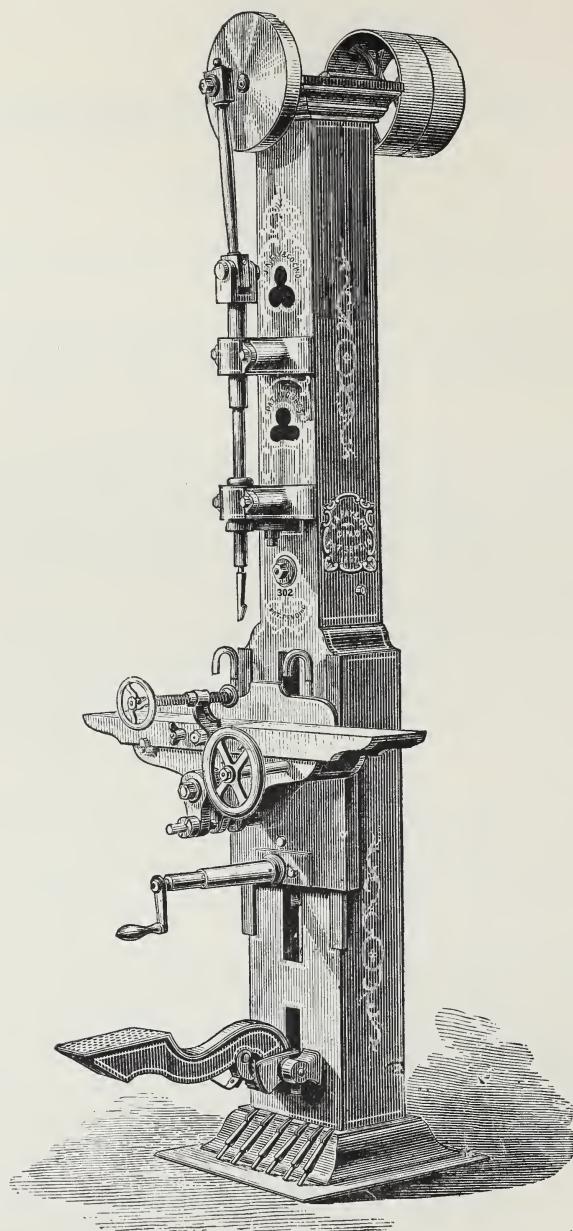
It is also arranged for radial mortising, and has adjustments in any required direction, and hence is remarkably well adapted for all kinds of mortising within its capacity. It is also supplied with our patent automatic chisel reverser, which receives the chisel bar while in motion or at rest, alternately in reverse directions, less than one inch movement of the table being necessary to accomplish it.

The patent compound treadle is arranged in a new and novel manner, so as to produce a greater or less throw of the table, as the nature of the work may demand, which also changes the depth of the mortise.

The adjustment is instantaneous and durable, and will be found much more convenient than other modes hitherto employed. The machine does not require to be stopped while changing the stuff, and the chisel will make 400 to 500 strokes per minute.

For mortising door stuff and all kinds of soft wood, no boring is required. Each machine is furnished with $\frac{1}{4}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, and $\frac{5}{8}$ inch chisels, and can be set up and put to work within an hour after being received.

The tight and loose pulleys, which are eleven inches in diameter and three-inch face, should make 400 to 500 revolutions per minute.



NO. 2

Patent Door and Sash Power Mortising Machine.

WITH COMPOUND BED,

COMPOUND TREADLE, AND AUTOMATIC CHISEL REVERSER.

NO. 2

Patent Door and Sash Power Mortising Machine.

WITH COMPOUND BED

AND AUTOMATIC CHISEL REVERSER.

The machine herewith illustrated, is constructed wholly of iron and steel, and is intended for mortising doors, sash, etc. It is built in the most substantial manner, and may be run at a much higher rate of speed than ordinary machines, and, in consequence, turn off a larger amount of work. It is conceded to be unsurpassed by any machine of the kind yet produced.

It is fitted with our new patent compound bed, on which the stuff to be worked is clamped, and moved under the chisel by a rack and pinion, the treadle raising the bed so that the chisel enters the wood gradually, and working in deeper and deeper at each stroke until the desired depth is gained, thus preventing the severe concussion and jar which always occurs when the chisel enters the wood at full depth.

The same bed can be used for straight mortising in the usual manner, as it is provided with bent stops for holding the stuff, which are arranged to swing and adjust to different heights, as may be desired.

The bed is also arranged for radial mortising, and has adjustments in any required direction, and hence is remarkably well adapted for all kinds of mortising within its capacity.

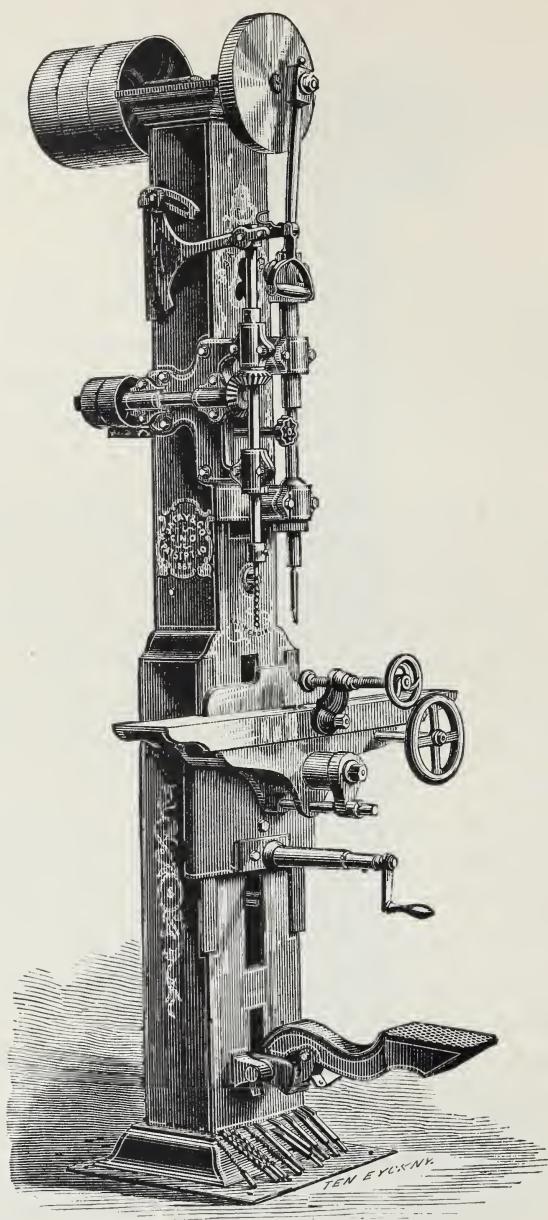
The treadle is arranged in a new and novel manner, so as to produce a greater or less throw of the table, as the nature of the work may demand, which also changes the depth of the mortise; and the adjustment being instantaneous and durable, it is much more convenient than other modes hitherto employed.

The treadle is admitted to be a decided improvement over those of any other construction, and the machine may be run at a high speed with scarcely any perceptible jar or tremble to the operator.

This machine is also fitted with our new patent reverser, which reverses the chisel bar automatically, while in motion or at rest, alternately in reverse directions, as required, less than one inch movement of the table being necessary to accomplish it. This self-reverser is new, positive, sure, and durable, and with many other features of the machine is universally admired.

The machine does not require to be stopped while changing the stuff, and the chisel will make four hundred strokes per minute. For mortising door stuff and all kinds of soft wood, no boring is required. Each machine is furnished with $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{6}$, $\frac{1}{2}$, and $\frac{5}{8}$ inch chisels.

The tight and loose pulleys are eleven inches in diameter and three-inch face, and should make 450 revolutions per minute.



NO. 3

Patent Cabinet Mortising and Boring Machine.

WITH COMPOUND TREADLE

AND AUTOMATIC CHISEL REVERSER.

NO. 3

Patent Cabinet Mortising and Boring Machine.

WITH COMPOUND TREADLE

AND AUTOMATIC CHISEL REVERSER.

This machine is especially adapted for ordinary work in hard wood and the heavier classes of building work. It is much used by cabinet and coach makers, and for light agricultural work.

It is fitted with our new patent compound bed, on which the stuff to be worked is clamped, and moved under the chisel by a rack and pinion. The treadle elevates the bed so that the chisel enters the wood gradually and works in deeper and deeper at each stroke, until the desired depth is gained, thus preventing the severe concussion and jar which is liable to occur when the chisel enters the wood at full length.

The same bed is also arranged so as to allow of mortising on an angle, has adjustments in every required direction, and is well adapted to every variety of mortising within its capacity.

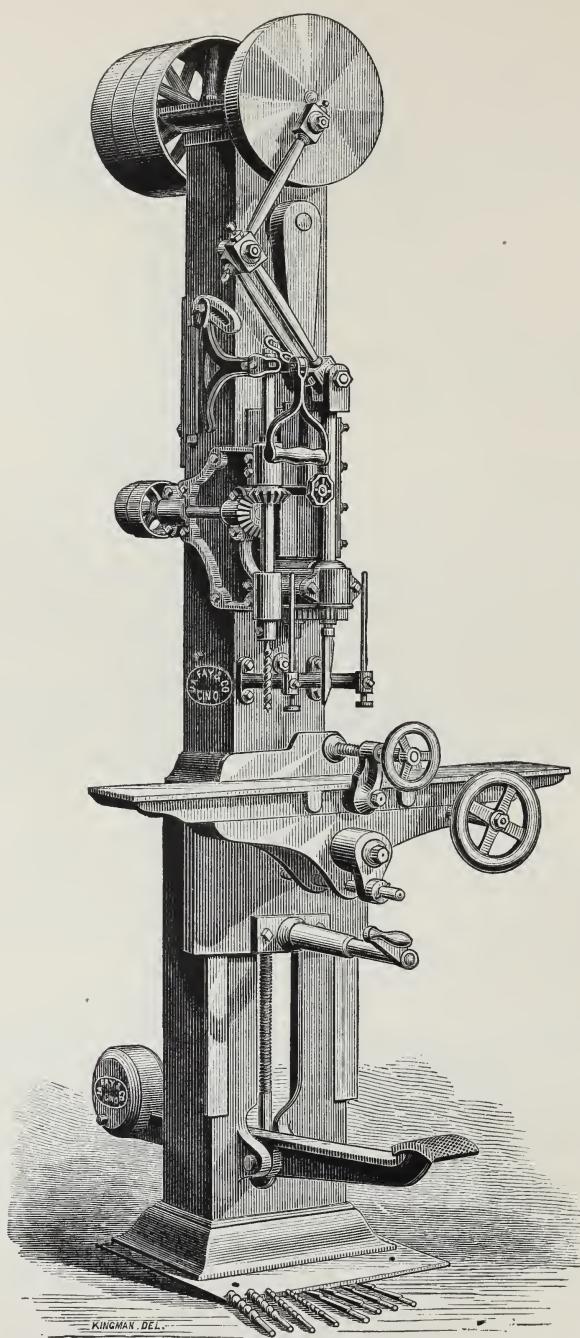
This machine is also provided with a boring mandrel, which is set on the same line with the chisel, so that the work can be bored and then run under the chisel and mortised without releasing it from the bed. This is not wanted however, except for hard wood, and can be used or not, at the will of the operator.

The treadle is arranged in a new and novel manner, so as to produce a greater or less throw of the table, as the nature of the work may demand, which also changes the depth of the mortise—this adjustment being instantaneous and durable, is admitted to be a decided improvement over those of any other construction.

The machine is also fitted with our new patent reverser, which reverses the chisel bar automatically while in motion or at rest, alternately, in reverse directions as required, less than one inch movement of the treadle only being necessary to accomplish it.

Each machine is furnished with $\frac{1}{4}$, $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{5}{8}$, and $\frac{3}{4}$ mortising chisels and augers to suit. The machine is not stopped while changing the stuff, and the chisel will make from 400 to 500 strokes per minute.

It is supplied with tight and loose pulleys, which are eleven inches in diameter and three-inch face, and should make 400 revolutions per minute.



NO. 3½

Patent Power Mortising and Boring Machine.

WITH COMPOUND BED,

GRADUATED STROKE, AND AUTOMATIC CHISEL REVERSER.

N.O. 3½

Patent Power Mortising and Boring Machine.

COMPOUND BED.

(WITH GRADUATED STROKE AND AUTOMATIC CHISEL REVERSER.)

This machine has been specially designed to meet the demand for a rapid working mortising and boring machine of comparatively small cost, for wagon, cabinet, and light agricultural work, where the large and extra heavy machines are not needed.

The construction of this machine is of the most substantial and durable character, every joint in the graduated movement being bored, turned, and compensating.

The entire machine is made of iron and steel, intended for hard service, so that with ordinary care it can be operated for years without repairs.

It is a lighter machine than the No. 4, but possesses many of the features of that machine, with the additional advantage of the automatic chisel reverser.

Attention is invited to the following points of excellence found in this machine:

1st. The perfectly graduated stroke of the chisel bar, commencing at a still point above the extreme upper throw, and so arranged that there is little or no perceptible jar to the foot of the operator on the heaviest work for which it is intended.

2d. The automatic chisel reverser—the simplest known; reverses the chisel bar automatically while in motion or at rest, with less than one inch movement of the treadle.

3d. The patent compound bed on which the stuff is clamped, and fed to the chisel by rack and pinion instead of moving the stuff by hand, effecting a great saving of labor when mortising heavy hard wood pieces. The bed also has a radial adjustment for angle mortising.

4th. The center of the augur of the boring mandrel is placed exactly in line with the center of the chisel, so that after being bored the piece has merely to be moved laterally to bring it under the chisel. The boring spindle has sufficient vertical range to enable the operator to bore the full depth of the mortise.

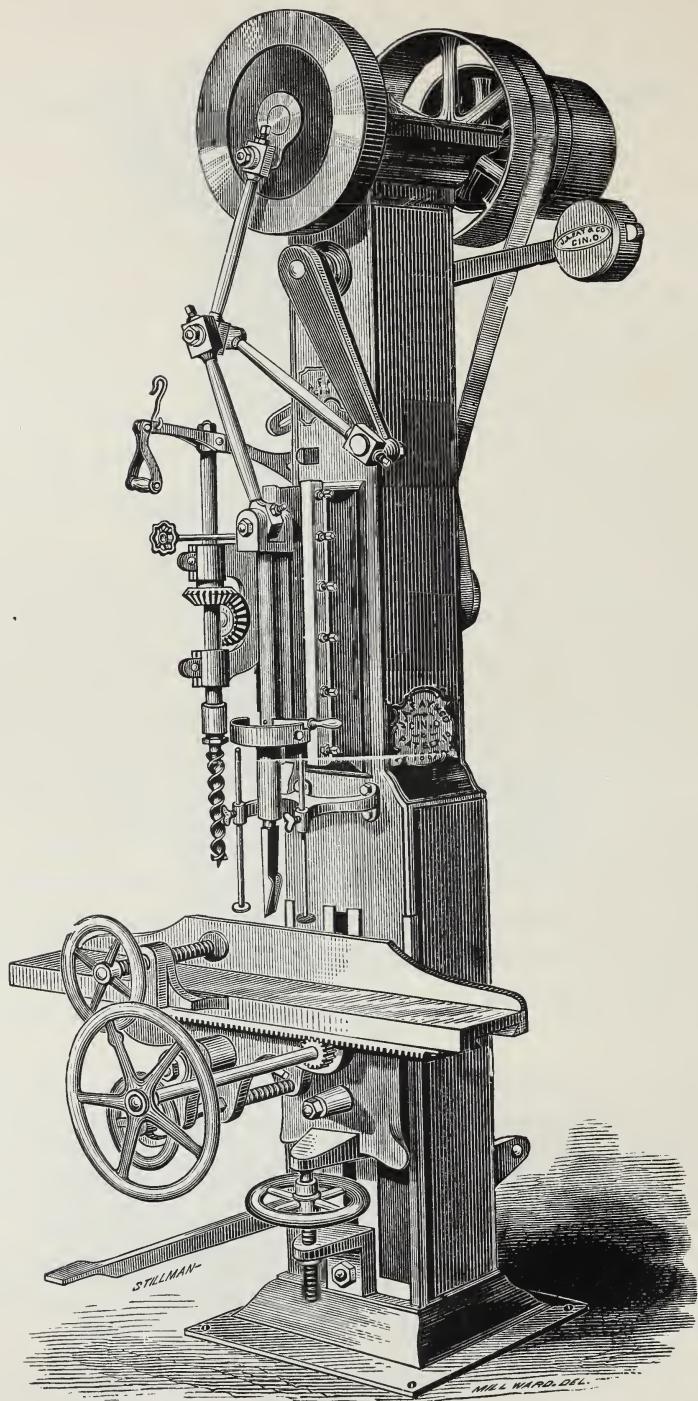
5th. The driving shaft is placed at the top of the column in self-oiling bearings, with heavily bolted caps to receive the impact of the chisel blow, and carries the crank wheel and tight and loose pulleys.

6th. Owing to the lightness and strength of the reciprocating parts, it can be run one-third faster than ordinary machines of this class, thus turning out a much larger amount of work in the same time.

It is provided with six chisels of the following sizes: $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, and 1 inch, with augers to match.

Every part of the machine is attached to and supported on the main column, no attachments of weights, treadles, or pulleys to the building being necessary.

It is provided with tight and loose pulleys which are twelve inches in diameter and three-inch face, and should make 325 revolutions per minute.



NO. 4

Patent Power Mortising and Boring Machine.

(WITH GRADUATED STROKE.)

NO. 4

Patent Power Mortising and Boring Machine.

(FOR AGRICULTURAL WORK.)

This is a very heavy and substantial machine, and capable of mortising most any description of timber. It is strongly recommended for agricultural and carriage shops, and wherever a strong machine for general work in hard wood is needed.

It has the perfectly graduated stroke, commencing at a still point above the extreme upper throw and working gradually down into the mortise, with little or no perceptible jar to the foot of the operator; and without any slides or levers, and with about one-half the pieces usually employed in machines of this class. Every joint in the movement is bored and turned and compensating, while there is not a single piece that will not last a life time with care and skillful use.

It runs without noise, and from the lightness and strength of the reciprocating parts, can be run one-third faster than any machine of like class.

The table on which the timber rests can be readily raised or lowered to suit different thicknesses by means of the screw immediately under the line of the chisel, which receives the force of the blow, and by which it is supported. The table is fitted with cross-slides, by which the piece can be readily moved into position, worked by a rack and pinion.

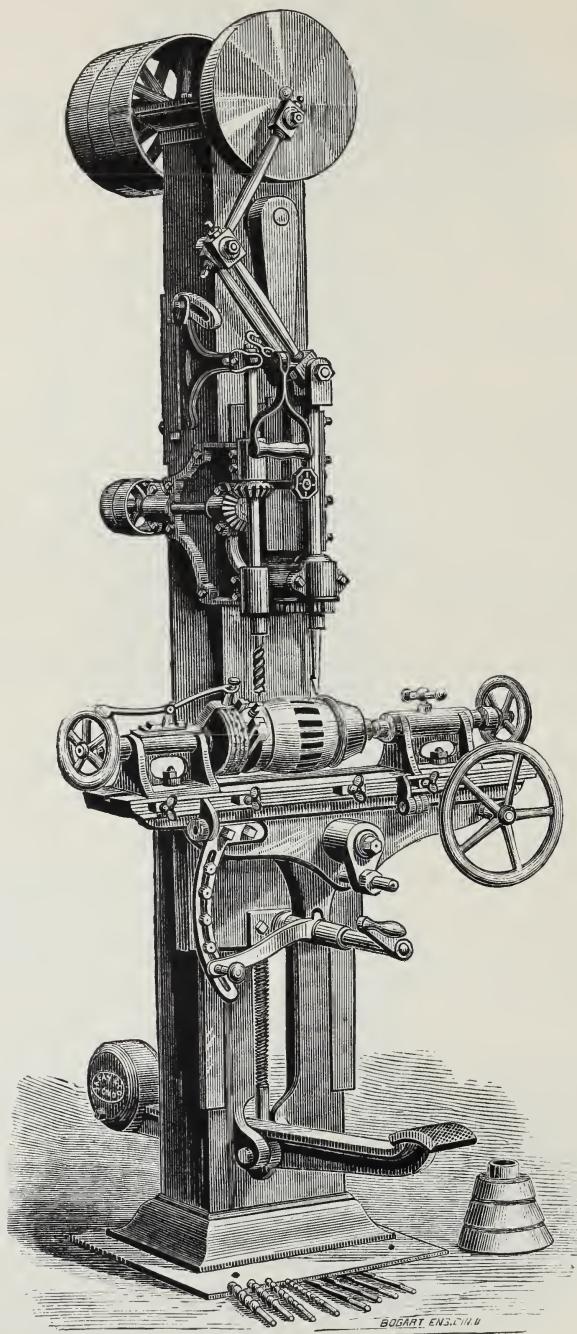
The boring apparatus is fixed in such position that the center of the auger is always exactly in line with the center of the chisel, so that the piece, after being bored, has merely to be moved laterally to bring it under the chisel.

The boring spindle has a vertical range, to enable the augers to bore clear through the largest piece of timber the machine will receive, and can be used as a separate boring machine, when not required for mortising.

It embraces many recent valuable patented improvements, is very heavy and substantial in its construction, simple in its arrangement, and successful in its operation. They are in use in many of the largest agricultural shops in the country, and are believed to be far superior to any other heavy power mortising and boring machine made.

We furnish with each machine nine chisels and nine augers, to match, viz.: $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1, $1\frac{1}{4}$, and $1\frac{1}{2}$. Any other sizes can be furnished, that may be wanted.

The tight and loose pulleys are twelve inches in diameter and four-inch face, and should make 325 revolutions per minute.



NO. 3½

Patent Hub Mortising and Boring Machine.

(WITH GRADUATED STROKE.)

SCREW CHUCK, TAPER CUPS, ETC.

NO. 3½

Patent Hub Mortising and Boring Machine.

(WITH GRADUATED STROKE.)

This machine is designed for a light class of hub mortising; and in the range of work to which it is limited, is not excelled in the speed of operation and ease of adjustment.

Among the points peculiar to this machine are the combination of the friction side plate and the graduated stroke to relieve the foot of the operator from all jar, the automatic reverser for the chisel, and the method of setting the table for the angles of the mortises.

The table is adjustable to different sizes of hubs, being raised and lowered by a screw worked by a crank in front. The chisel is brought down to the work by the action of the treadle, the chisel connections being lengthened as the treadle is depressed, thus bringing the chisel into the mortise gradually, from a still point, to the full length of the stroke.

The sliding friction-plate, connected with the treadle, prevents concussion of the blows of the chisel from reaching the foot of the operator.

It is also supplied with our patent automatic chisel reverser, which reverses the chisel bar while in motion or at rest, alternately in reverse directions, less than one inch movement of the table being necessary to accomplish it.

The table is arranged with a chuck, fastening the hubs at one end, the other end turning in a cup. The jaws of the chuck are operated by a screw, and the chuck has an index plate with its periphery drilled with a series of holes by the use of which the number of mortises in the hub is graduated.

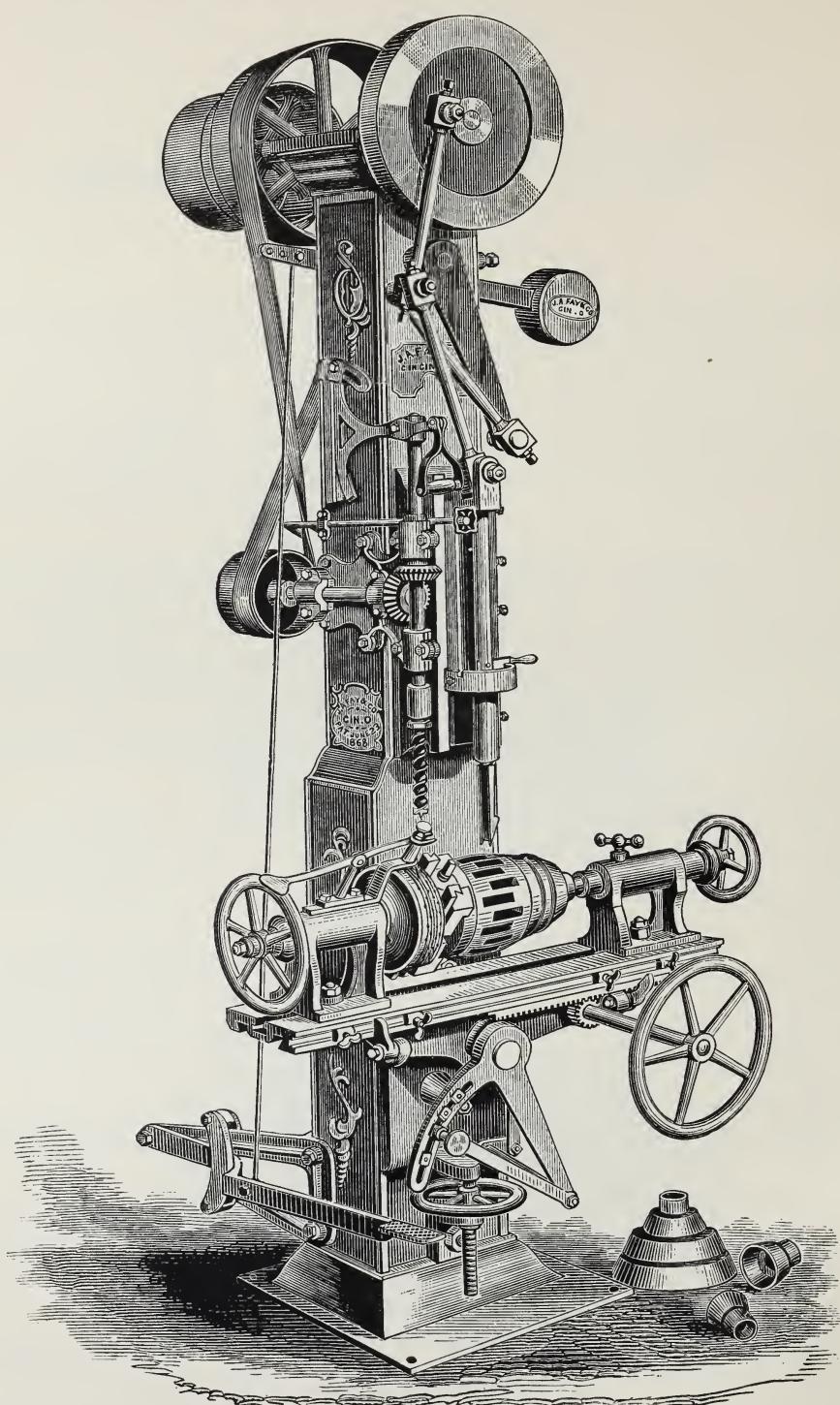
The length of the mortise is accurately graduated by means of stops on the table. It will work both straight and zig-zag mortises.

The angles of the mortise are governed by a lever set in position and held as may be desired, in a series of movable poppets in a slotted curve piece attached to the table, the whole arrangement moving with the table.

The boring attachment is driven from the shaft at the top of the machine. The auger is placed on the line of the chisel, that after the hub is bored, by the action of a rack and pinion turned by a hand-wheel, the hub is moved under the chisel and mortised.

The capacity of this machine is from thirty to sixty set of hubs per day, according to size and capacity of the operator. We send seven chisels and augers with each machine, viz: $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{11}{16}$, $\frac{3}{4}$ inches.

The tight and loose pulleys are twelve inches in diameter and three-inch face, and should make 300 revolutions per minute.



NO. 4

Patent Hub Mortising and Boring Machine.

WITH GRADUATED STROKE,

EXPANSION CHUCK, TAPER CUPS, ETC.

NO. 4

Patent Hub Mortising and Boring Machine.

(WITH GRADUATED STROKE.)

This is a very simple and powerful machine, and strongly recommended for all kinds of hub mortising. It embraces many valuable patented improvements, is very heavy and substantial in its construction, simple in its arrangement, and perfectly successful in its operation. It is well represented by the engraving, by referring to which any mechanic can put one together.

The combination and arrangement of the working parts is one that admits of the greatest accuracy and rapidity in boring and mortising hubs of any size up to twelve inches in diameter and eighteen inches long.

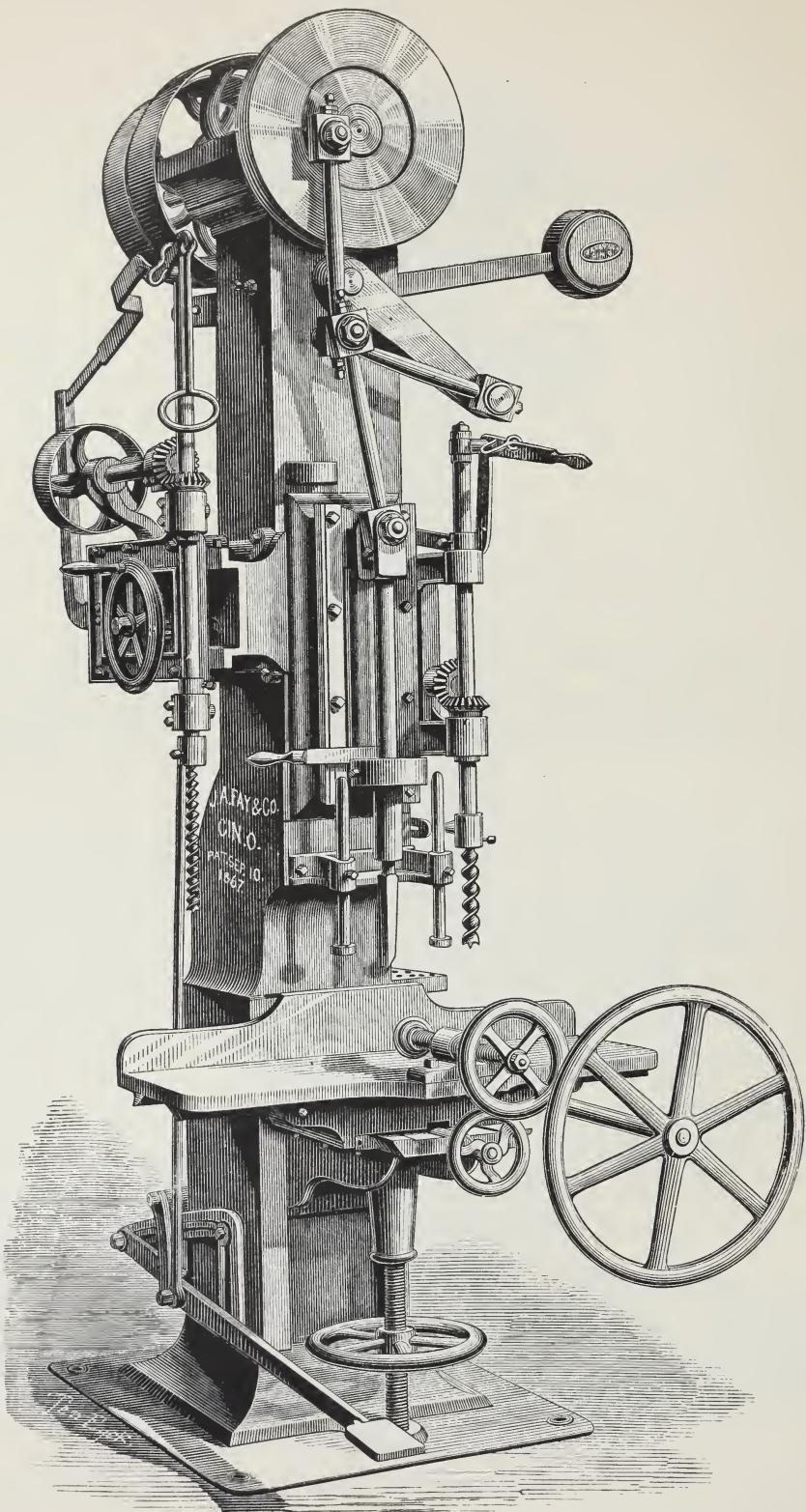
It has a perfectly graduated stroke, commencing at a still point above the extreme upper throw, and working gradually down into the mortise with little or no jar to the foot of the operator, the chisel mandrel being vibrated only when the chisel is brought down to the work.

In ordinary hub mortising machines the chisel runs constantly, and moves as much above the line of the mortise as it is required to do below, which causes unnecessary strain and wear of the working parts, and makes it very hard for the operator. Owing to the novel construction of the reciprocating parts, this defect is overcome, and the machine can be run one third faster than other machines. The mortising and boring apparatus may both be driven by one belt from the countershaft, or independent of each other, as may be desired.

The hubs are confined in a screw chuck, the arms on its face being operated at the same time and by a single screw. It has a graduating wheel, accurately spaced for 10, 12, 14, 16, and 18 spokes, thus obviating the necessity for setting out. The dish of the mortise is regulated by a lever, having a crank and connections attached to the table.

The lever has a handle with a spring top, which works into adjustable poppets in a slot on the same circle as the lever handle described. The lever supports with the slotted piece are rigidly fixed to the center, upon which the table swings, and convenient to adjust the angle of the mortise instantly. Eleven chisels are furnished with each machine, with augers to match, viz: $\frac{3}{8}$, $\frac{7}{16}$, $\frac{1}{2}$, $\frac{9}{16}$, $\frac{5}{8}$, $\frac{11}{16}$, $\frac{3}{4}$, $\frac{13}{16}$, $\frac{7}{8}$, $\frac{15}{16}$, 1 inch.

Tight and loose pulleys are twelve inches in diameter and four-inch face, and should make 325 revolutions per minute.



NO. 6

Large Patent Car Mortising and Boring Machine.

WITH

(REGULAR AND AUXILIARY BORING ATTACHMENTS.)

NO. 6

Large Patent Car Mortising and Boring Machine.

WITH GRADUATED STROKE,

REGULAR AND AUXILIARY BORING ATTACHMENTS.

This is an extra heavy machine, erected from new designs, and adapted for the heaviest description of car and bridge work, being capable of cutting a two and one-half inch mortise through sixteen-inch timber.

It is constructed upon a hollow column of very strong section, having a broad base, upon which it stands firmly upon the floor. It is made entirely of iron and steel, and every part is attached to and supported on the main column; no attachments of weights, treadle, or pulleys to the building being necessary.

The chisel bar has a perfectly graduated stroke, commencing at a still point above the extreme upper throw and working gradually down into the mortise, with little or no perceptible jar to the foot, under perfect control of the operator, without slides or lever, and with about one-half the joints usually employed in machines of this class.

The bed will receive timber up to seventeen inches square, and the chisel will beat a mortise to the center of sixteen inches and eight inches deep, or, by changing the face of the stick, it can be made to work clear through.

The bed or table is supported on a central screw, by which means the thrust or blow of the chisel is terminated to the foundation, and does not fall upon the table bracket. It has two boring attachments: one on a line with the chisel to bore for the mortises, which will bore to ten inches from the center of column; also, an adjustable auxiliary boring attachment, for boring bolt holes, which will bore seventeen-inch stuff.

We furnish with each machine nine chisels and augers, to correspond; sizes $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{7}{8}$, 1, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$, and $1\frac{1}{2}$ inches; also, long augers for boring joint bolts, $\frac{9}{16}$, $\frac{11}{16}$, $\frac{13}{16}$. A countershaft for driving the auxiliary boring attachment is also supplied with each machine without charge.

Especial attention is called to the fact that every joint in the graduated movement is bored and turned, and is compensating, while there is not a piece that will not last years with care and skillful use. They are in use in many of the largest railroad and car shops in the country, and warranted to give the highest satisfaction.

The tight and loose pulleys are sixteen inches in diameter and four-inch face, and should make 275 revolutions per minute.

Reciprocating Scroll Saws.

In no class of wood-cutting machinery has there been expended, perhaps, more thought and ingenuity than on scroll saws. Of the very large variety of machines invented and introduced, the best and most successful forms may be said to be those in which the tension of the saw is nearly uniform in all parts of the stroke, and machines in which the saw has no strain, the lower end being held by a rigid fastening, the upper part running loose between anti-friction back and side guides adjustable for various thicknesses.

We make two varieties of these machines, believing them to embody the only true and correct principles in reciprocating scroll saws. The first we designate as Fret Scroll Saws, or those having a uniform tension at all points of the stroke and adapted to any style of work, and particularly to all kinds of ornamental and fret sawing, veneered work, brackets, etc.

The saw is quickly inserted or removed, and there is nothing in the way of the material to prevent the sawing of any curve desired. They can be run at a very high rate of speed, are simple, easy to operate, and seldom need repair. The other style is the unstrained saw, having a rigid fastening at the bottom, with appropriate back and side guides to support the saw above the work.

These machines are so well known for their general good qualities, such as high speed, rapidity of operation, simplicity of construction, etc., that it is not necessary to add more; a full description will be found with the illustrations. These improvements are secured to us by letters patent for our protection, and will be found on no other Scroll Saws.

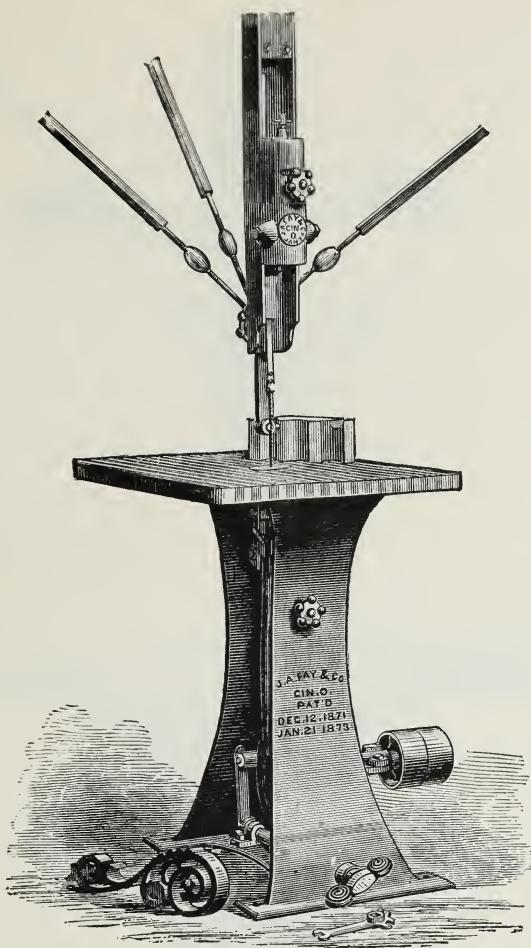
The J. A. Fay & Co. Patent Scroll Saws have been invented and perfected to meet the requirements of all classes of manufacturers, and for all purposes. The thousands in use is sufficient evidence of their popularity.

Some of their distinguishing features may be classed as follows:

- 1st. The lightness of the reciprocating parts, which are self-lubricating.
- 2d. The manner of attaching, and the facility with which the saws can be changed.
- 3d. The uniform tension of the saw at different points of the stroke.
- 4th. The facility for increasing or diminishing the same.
- 5th. The arrangement to secure a greater or less rake to the saw.
- 6th. The high speed they can be run without vibration or trembling.
- 7th. The quickness with which they may be started or stopped—less than five seconds.
- 8th. The trifling expense required to keep them in repair.
- 9th. The great range and amount of work they will perform.
- 10th. The patent brake and belt shipper for instantly arresting or imparting motion, etc.

We make six different styles and sizes of these saws, viz:

- No. 1. Fret Scroll Saw, for light sawing, bracket and ornamental work.
- No. 2. Fret Scroll Saw, for heavy and light sawing of all kinds.
- No. 3. For chair factories and light hard wood sawing.
- No. 4. For felloes, agricultural implement and heavy work.
- No. 5. For sash and door, furniture makers, etc.
- No. 5½. For pattern makers, and carpenters' work, etc.



NO. 1

Patent Fret Scroll Saw.

This machine is well adapted for all kinds of scroll sawing, particularly light fret, bracket, and furniture sawing, and is a general favorite wherever used.

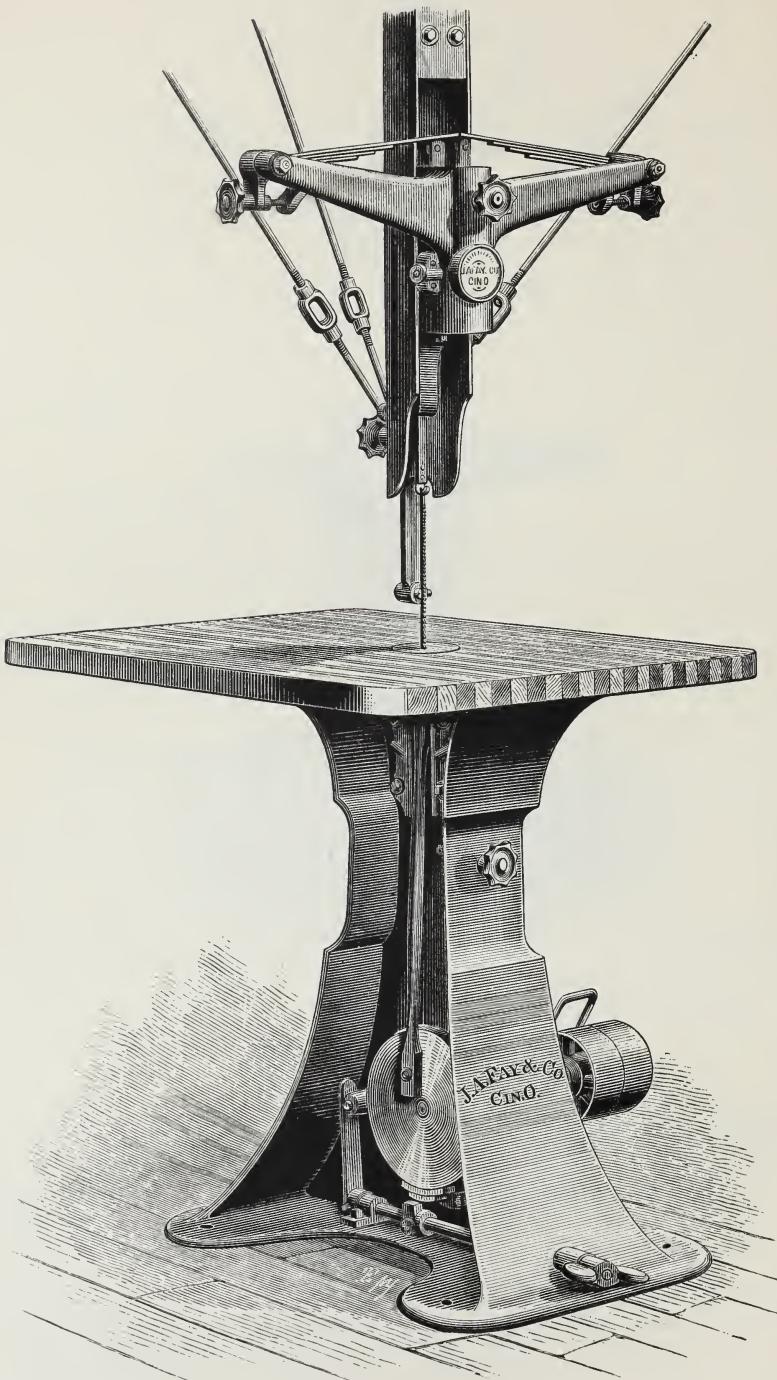
The saw is strained by a deflecting spring in connection with an eccentric cone, so made that as the straps are wrapped on it, it has a lesser leverage, as the strain upon the spring is greater, compensating for the distance the saw may travel in the length of its stroke. The straining devices are inclosed in an iron case, which has a vertical movement on planed sides, to accommodate different lengths of saws, controlled by the hand wheel in front.

The saws are secured to the connecting strap and cross head, and can be instantly removed or replaced. The back of the saw runs in an adjustable hardened steel guide.

The cross heads can be adjusted to give the saw more or less rake by the hand wheel in front. The cross head slides have self-oiling globes to insure their lubrication. It has an efficient brake and shipper for arresting the motion, operated by the foot.

The table is glued up of strips of ash and black walnut, and the entire machine is furnished in a most excellent manner. Parties who desire a good low-priced machine, will find it suited to their wants.

It is furnished with our patent tight and loose pulleys, which are six inches in diameter and three-inch face, and should make 1,100 revolutions per minute.



NO. 2
Patent Fret Scroll Saw.

(WITH NEW STRAIN, AND PATENT BRAKE AND SHIPPER.)

NO. 2.

Patent Fret Scroll Saw.

(WITH NEW STRAIN AND PATENT BRAKE AND SHIPPER.)

The opposite engraving is a true illustration of our No. 2 Patent Fret Scroll Saw, especially designed for carpenters and builders, cabinet, bracket, piano, wagon, carriage, and pattern makers' use, and for all external and internal curves, as the saw can be quickly detached and replaced, and it will saw raking brackets up to fourteen inches.

It has received the highest commendation from all who have used it, and has been awarded the first premium over all competition wherever exhibited.

The body of the machine is cast in one piece, forming a very solid and permanent base, giving the machine, while in operation, a firmness not otherwise obtainable. The reciprocating parts are very light, to obviate, as far as possible, the effects of their inertia in upward and downward movements.

The tension of the machine is flexible, the upper end of the saw being attached to a strap, which, at its upper end, is connected to a segment pulley connecting with an eccentric roller, to which is attached straps connecting with two steel springs, constructed of a series of plates of different lengths.

This combination produces, in operating, an almost equable tension throughout all parts of the stroke of the saw, the eccentricity of the roller being so adjusted that, as the saw is drawn in its downward stroke the lessening flexibility of the springs is compensated for, by the shortening leverage of the eccentric roller.

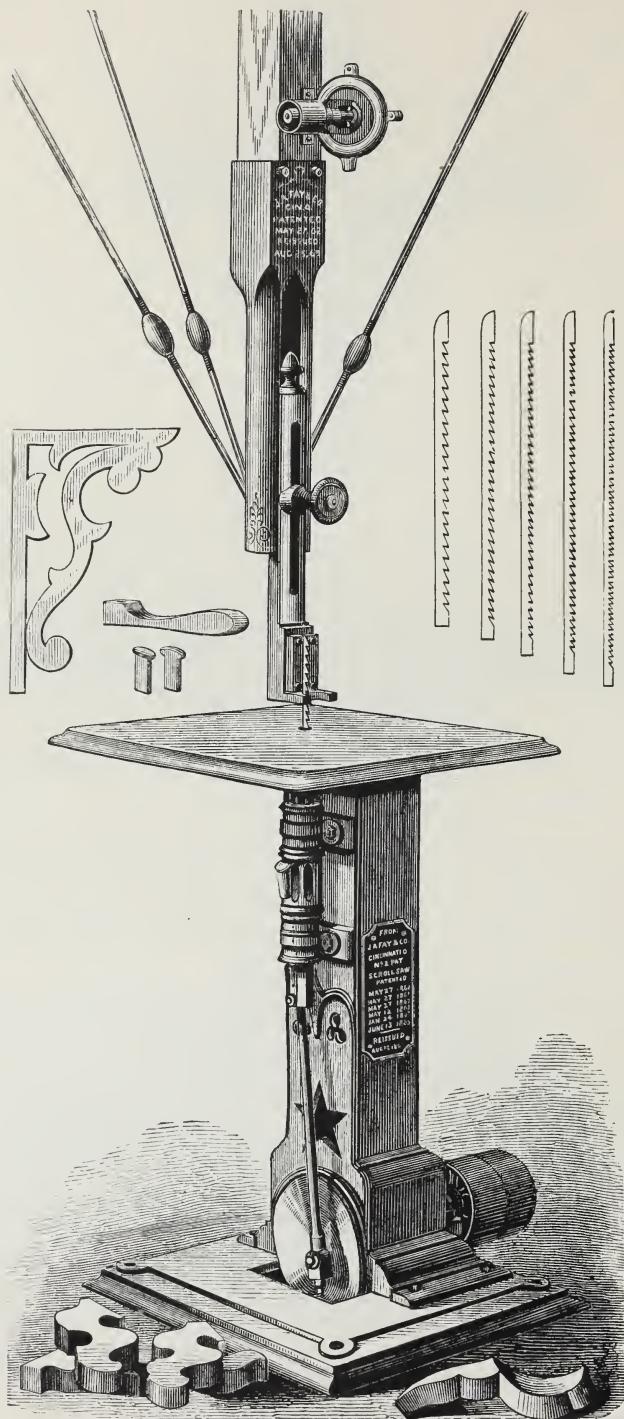
The springs are attached to a sliding cross frame, adjustable to and from the table for different lengths of saws.

There is an efficient brake and shipper attached for starting and stopping the machine—operated by foot. The cross-head is adjustable, and can be set to any desired rake by simply turning the hand wheel in front.

Some of the distinguishing features may be enumerated as follows:

- 1st. The uniform tension of the saw at different points of the stroke.
- 2d. The facility for increasing or diminishing the same.
- 3d. The arrangement for varying the rake of the saw.
- 4th. The ease with which the saws can be attached or detached.
- 5th. The high speed it may be run without vibration.
- 6th. The patent brake and shipper, by which it is almost instantly started and stopped.
- 7th. The amount and range of work it will perform.
- 8th. The trifling expense required to keep it in repair.

It is supplied with gun metal guides, self-oiling globes, flexible steel reciprocating parts, steel cross-heads, etc.; also the patent tight and loose pulleys, which are six inches in diameter, and three-inch face, and should make 1,100 revolutions per minute.



NO. 3

Patent Unstrained Scroll Saw.

NO. 3

Patent Unstrained Scroll Saw.

This is our smallest size unstrained scroll sawing machine. It is designed for general work in small cabinet, sash, and blind shops, and to meet the demand for a low priced, good scroll saw, for light work.

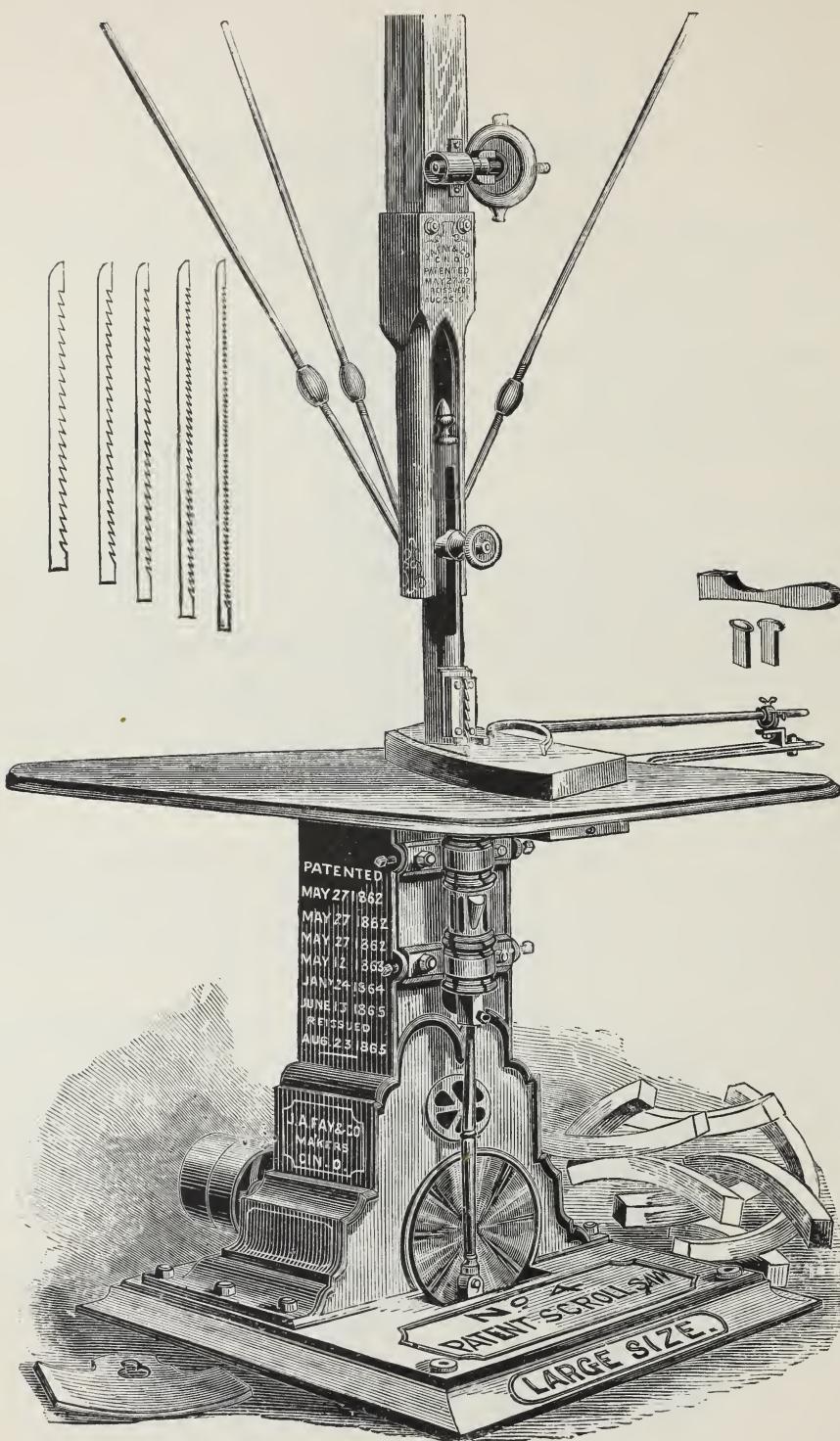
The reciprocating slide is made hollow, octagonal in shape, and consequently is very light. The pitman is connected by socket joint to the lower end of slide, and the lower end of the saw blade rigidly fastened to the top of the reciprocating slide by means of split pins.

The upper end above the table is left entirely disconnected, but in order to guide and support it during the operation of sawing, it is made to run between hardened steel guides. These are formed of three parts, viz: a back plate and two adjustable side plates, for accommodating different thicknesses of saws, attached to a vertically sliding bar, which is raised and lowered to suit the thickness of the material being sawed, and which acts to hold down and prevent flying up of the stuff being sawed. The guides also allow of freely turning the work while the sawing is progressing, a clear, open space being left between the guard and the table.

It is furnished with wrought pitman, hard metal boxes throughout, steel crank shaft, and iron table. Our new improved top guide, in which the saw runs, is moved vertically for different thicknesses of stuff being sawed, and is adjustable in any direction to keep the saw square with the table by the double nuts on the side rods.

The machine being run at a high rate of speed, the work is performed very smoothly, requiring but little finishing; and the cost for repairs is next to nothing. It is also provided with a noiseless fan blower which supplies a continuous and powerful current of air to the work, enabling the sawyer to work to his lines; and the machine may be belted up through the floor or from the back side. Full directions for setting up accompany each machine.

It has the patent tight and loose pulleys, which are six inches in diameter and three-inch face, and should make 1,200 revolutions per minute.



NO. 4
Patent Unstrained Scroll Saw.

WITH

(RADIUS ATTACHMENT FOR FELLOES.)

NO. 4

Patent Unstrained Scroll Saw.

(WITH RADIUS ATTACHMENT FOR FELLOES.)

This is a very heavy and substantial machine, especially adapted for heavy sawing, and is quite extensively used in chair, plow, wagon, agricultural, railroad shops, etc. It fully meets the want for a good scroll saw for hard wood sawing, that will perform its work without disarrangement or breakage.

The machine is furnished with improved patent top guide, to the lower end of which is attached, for guiding and supporting the upper disconnected end of the saw while in operation, hardened steel guides, consisting of three parts, viz.: a back plate and two adjustable side plates, for accommodating different thicknesses of saws.

This guide is also moved vertically for different thicknesses of stuff being sawed, and serves to hold the work to the table; it is also adjustable in any direction, to keep the saw square with the table, which is done by the double nuts seen on the rods in the cut, and also allows of freely turning the work while the saw is progressing.

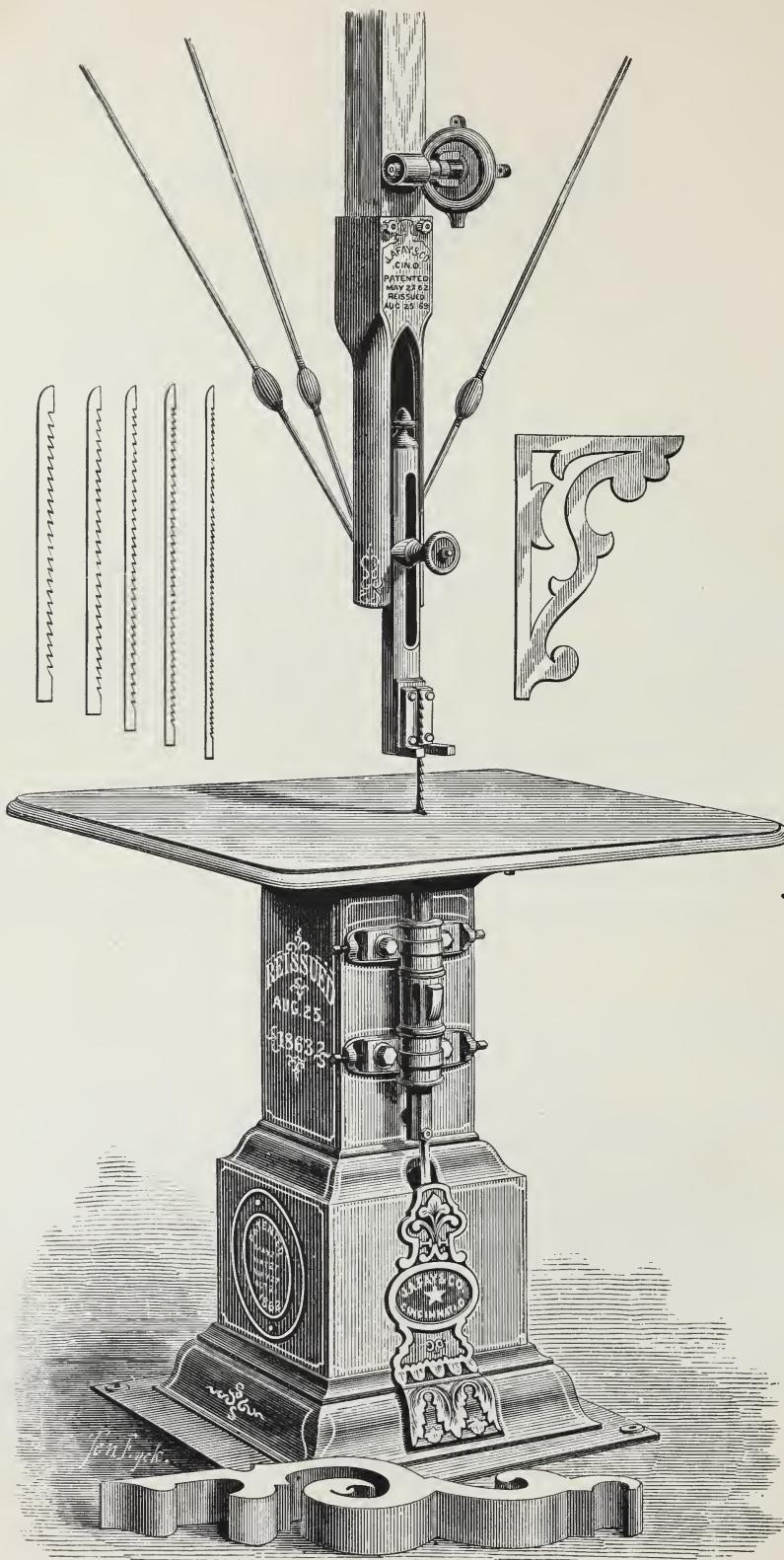
The reciprocating slide is made hollow, octagonal in shape, and consequently is very light. The pitman is connected, by socket joint, to the lower end of slide. The lower end of the saw blade is rigidly fastened to the top of the reciprocating slide by means of split pins.

The reciprocating parts are self-lubricating, and, while being strong and lasting, are light, admitting of the machine being run at high speed.

When ordered, we furnish a felloe sweep attachment, for chair back and felloe sawing. This is made so as to saw a perfect felloe, both inside and outside circles.

As in other machines, it is equipped with a noiseless fan blower, full assortment of saws for the different work required, and directions for setting up, and it will be found complete in every detail.

It has the patent tight and loose pulleys, which are eight inches in diameter and three-inch face, and should make 900 revolutions per minute.



NO. 5

Patent Unstrained Scroll Saw.

NO. 5

Patent Unstrained Scroll Saw.

(WITH PATENT TOP GUIDE.)

This machine is one of the most successful and popular scroll sawing machines ever constructed, and has been awarded medals over all competitors wherever exhibited, more than one thousand being in use.

It is very heavy and substantial, built wholly of iron and steel, and is intended for use in sash and door, chair, furniture, and pattern shops, etc., where its simplicity and great efficiency make it a favorite.

The reciprocating parts are very light and self-lubricating, so that the machine may be run at a high rate of speed, even in upper stories, where they operate equally as well as on the ground floor.

The reciprocating slide is made hollow and octagonal in shape, making it very light and strong. The pitman is connected by socket joint to the lower end of the slide. The lower end of the saw blade is rigidly fastened to the top of the reciprocating slide by means of split pins.

The upper end of saw above the table is left entirely disconnected, but in order to guide and support it while in operation it is made to run between hardened steel guides formed in three parts, viz.: a back plate and two adjustable side plates for accommodating different thicknesses of saws.

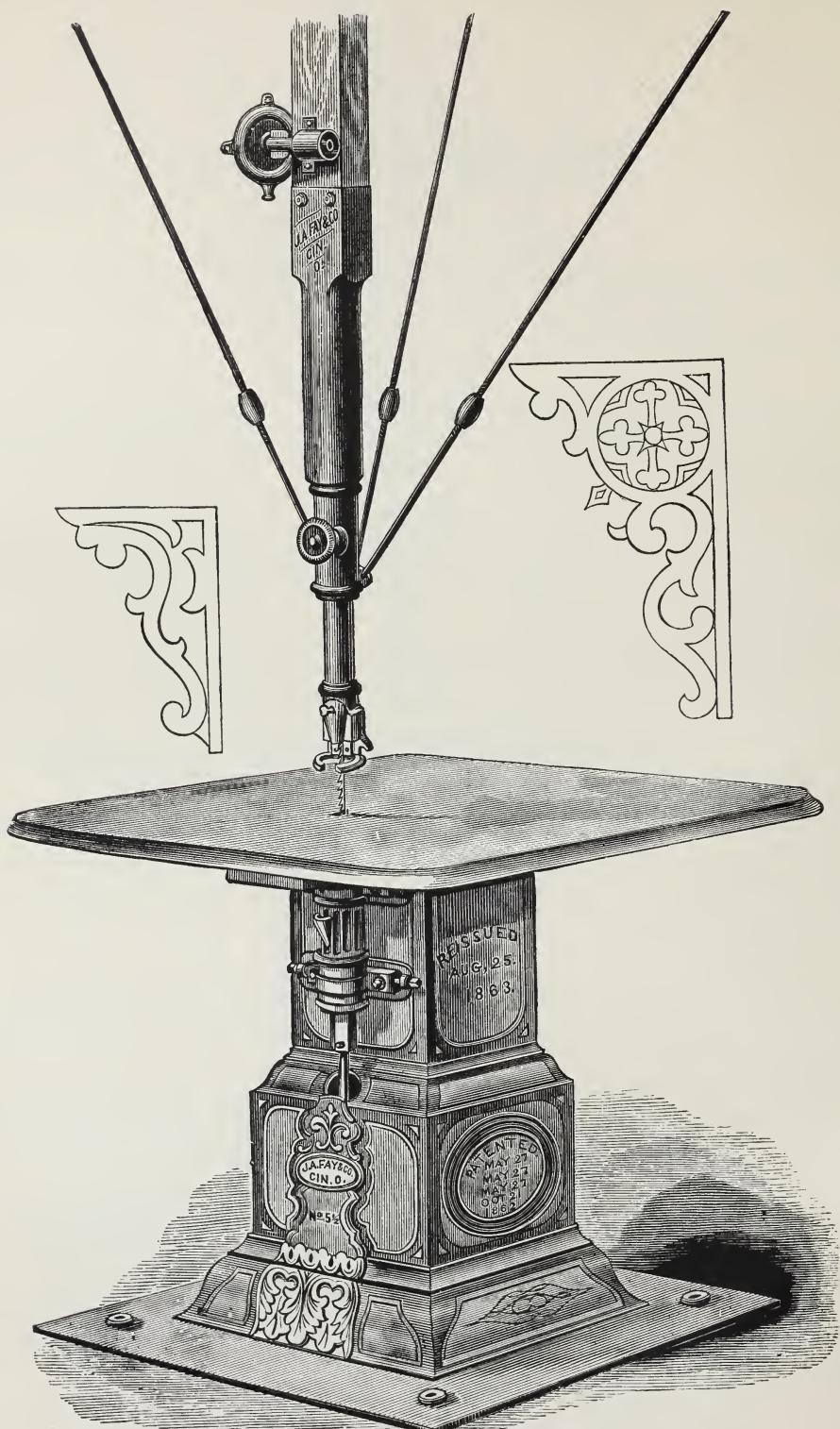
This is connected to a vertically sliding top guide, which is raised and lowered to suit the thickness of material being sawed, and acts as a hold-down to the stuff being worked.

The guide also allows of freely turning the work while the saw is progressing, a clear open space being left between the guide and the table, and is also adjustable in any direction to keep the saw square with the table.

This is accomplished by the double nuts seen on the rods. The saws can be adjusted with great rapidity, and the machine is very easy to operate and keep in order.

It is furnished with a noiseless fan blower, for displacing the saw dust, enabling the sawyer to work his lines, six assorted saws, and is ready to run as soon as received and the power applied.

It is supplied with the patent tight and loose pulleys, which are six inches in diameter and three-inch face, and should make 1,000 revolutions per minute.



NO. 5½

Patent Unstrained Scroll Saw.

(WITH PATENT METAL TOP GUIDE.)

NO. 5½

Patent Unstrained Scroll Saw.

(WITH PATENT METAL TOP GUIDE.)

This machine is about the same in size and capacity as the No. 5 Patent Scroll Saw, illustrated and described on preceding pages, and is designed for similar classes of work in pattern, furniture, sash and door shops, etc.

It is constructed in the most careful and thorough manner, and is considered by many as the best scroll saw ever made. It has invariably proven itself reliable for the purposes for which it is intended, and is a favorite with practical scroll sawyers.

The top is made of iron planed perfectly true. It has our new style patent metal top guide, which consists of a brass tube adjustable vertically in a sleeve for different thicknesses of stuff being worked, the sleeve also having a separate adjustment in any direction to keep the saw square with the table by means of the double nuts seen on the rods in the engraving.

Attached to the lower end of this top guide, for guiding and supporting the upper end of the saw while in operation, is a hardened steel guide formed in three parts, viz: a back plate for receiving the thrust, and two adjustable side plates for accommodating different thicknesses of saws. This top guide allows of freely turning the work while it is being sawed.

The reciprocating slide is made hollow, octagonal in shape, and consequently is very light, admitting of a high rate of speed without trembling. The pitman is connected by socket joint to the lower end of slide.

The lower end of the saw blade is rigidly fastened to the top of the reciprocating slide by means of split pins. The amount of work it will accomplish is truly surprising, and it is performed with great smoothness, requiring little or no finishing.

The saws can be readily changed, and the machine is easily kept in order and not liable to disarrangement, requiring a very small expense for repairs. Any person of ordinary ability can learn to operate them in less than one hour's time.

It is furnished with the noiseless fan blower, twelve saws of assorted sizes, full directions for setting up, and will be found ready to operate as soon as placed in position and adjusted.

It is supplied with the patent tight and loose pulleys, which are six inches in diameter and three inch face, and should make 1,000 revolutions per minute.

Patent Band Sawing Machines.

The Band Saw has become an indispensable feature in the various branches of wood production, and its economical operation is so generally understood that an argument for its adoption or a history of its introduction would be superfluous; yet there are improvements and changes which have been made that are of sufficient importance to mention here.

The original Band Saw Machine was designed only for cutting curves in light work, and for many years that was the only service to which it was adapted; recently, however, the demands of the lumber trade have made necessary new combinations, and we have perfected saws and machines for the heaviest class of work where the sawing of the material is a feature of sufficient magnitude to make an object, the investment and care necessary for the successful operation of such tools.

These saws are constantly becoming more popular as the various improvements make their operation more profitable, and it has been our aim in the varied experience derived from the experiments produced by the construction of new machines of this class to adopt the methods most likely to produce the desired result with the least cost.

The columns of the band saw machines for scroll work are cast with cored sections, in one piece, having flanged corners on the larger machines to insure greater stiffness, so that when once properly adjusted in all their parts, they will not be easily disarranged.

An important feature in our Band Sawing Machines is the arrangement of the upper wheel for keeping the saw blade at its proper tension, allowing, at the same time, for sufficient flexibility by reciprocating motion to compensate sudden strain and to prevent breaking the saws by buckling or friction. The combination to accomplish this consists in the patent elastic steel wheel, which, by the lightness of its construction, greatly reduces the strain on the saw produced by starting and stopping it, and the patent weighted lever for sustaining the upper wheel with the slide boxes, etc., giving the operator a perfect knowledge of the amount of strain upon his saw, and an opportunity of controlling it according to the strength of the blade in use; at the same time compensating for any change in the length of the saw from change of temperature or impact.

The patent friction guide wheels, to receive the back thrust of the saw, and the adjustable side guides, are features of great importance in the operation of the Scroll Sawing Band Saw, and reduces the friction on the back of the saw to a nominal quantity in comparison to the old ruinous method of running the back of the saw against a fixed or solid bearing.

The Re-sawing Band Saw Machines have, in connection with the friction wheels and adjustable side guides, an entirely new principle incorporated to prevent the saw from running and buckling in wide lumber, by allowing the saw to swing free. The center of its motion being from the point of the teeth, keeps the saw in a constant line parallel with the side of the stuff being sawed.

These guides are placed on a column, and are in line vertically, with no danger of displacement. The lower wheels of the smaller machines are of iron, and both wheels of the re-sawing machines are of iron or have cast-iron arms with wooden rims, according to the size and character of the work to be done.

The shafts are of steel, and run in patent self-oiling boxes with caps, which can be adjusted to take up the wear in the parts. The vertical guide bar is provided with a retracting spring to assist in raising it.

The tables have an adjustment for sawing to a bevel.

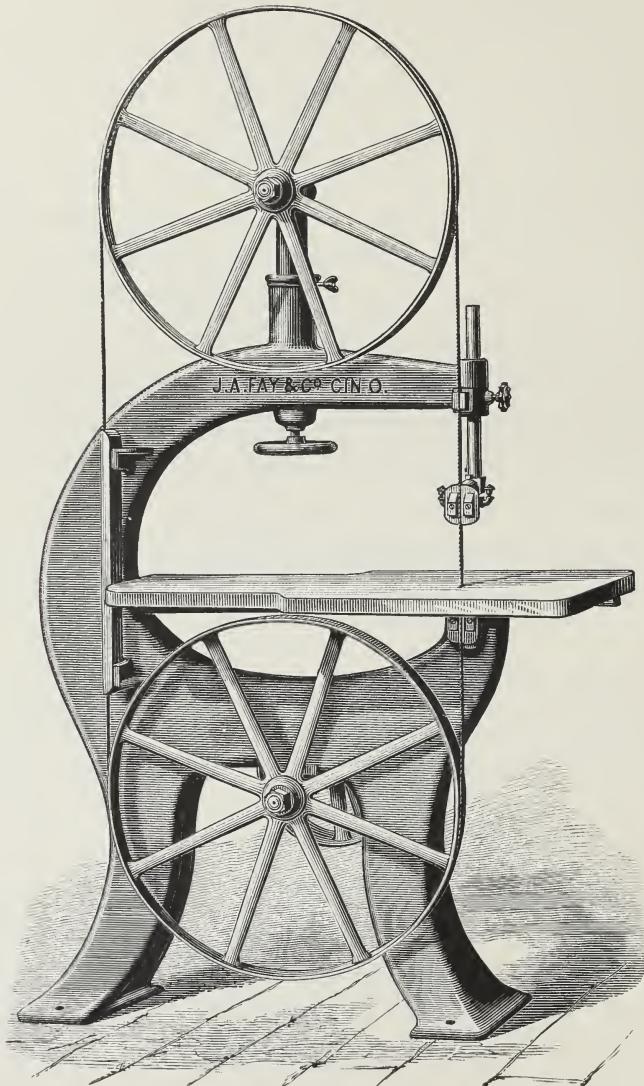
There is a patent shipper and a frictional brake attached to the machine for throwing the belt on and off the tight pulley, and for quickly arresting the motion of the saw. Also, guards to prevent contact with the saw while in operation.

The arrangement for guiding the saw to the center or any desirable part of the face of the band wheels is very simple in the smaller machines. It is accomplished by throwing the upper wheel more or less out of a perpendicular, while in the large machines the same is accomplished by turning the upper wheel on a plane horizontal to its center of revolution. This can be done while the machine is in operation.

For the economical working of these machines the best saw blades should be used; and as the band saw blades of Messrs. Perin, Panhard & Co., of France, have the highest reputation of any in use, we recommend them without fear of failure. All regular sizes can be furnished without delay.

The patents on these machines owned by us are placed on the machines for the benefit of ourselves and the users of these machines. Any infringement of the same will be duly noticed.

The construction, character, and capacity of each machine will be found in detail with the subsequent illustrative descriptions. They are made in seven different sizes and styles, adapted from the lightest to the very heaviest classes of work.



NEW "GEM"
Patent Band Sawing Machine.

(WITH LEMMAN'S PATENT ROLLING GUIDES.)

NEW "GEM"

Patent Band Sawing Machine.

(WITH LEMMAN'S PATENT ROLLING GUIDES.)

The accompanying engraving represents one of a new series of low-price Band Saw Machines we have recently perfected and brought out, designed to meet not only this want, but all the requirements of ordinary scroll and curve cutting, among the many thousands of wood-workers all over the land. It is so complete in its adaptation to the general wants that we have designated it the "Gem" Band Saw Machine.

A want has long been felt for a machine of this kind, which, while possessing the advantages of the larger and more costly machines, would be so economical in price as to place it within the reach of all.

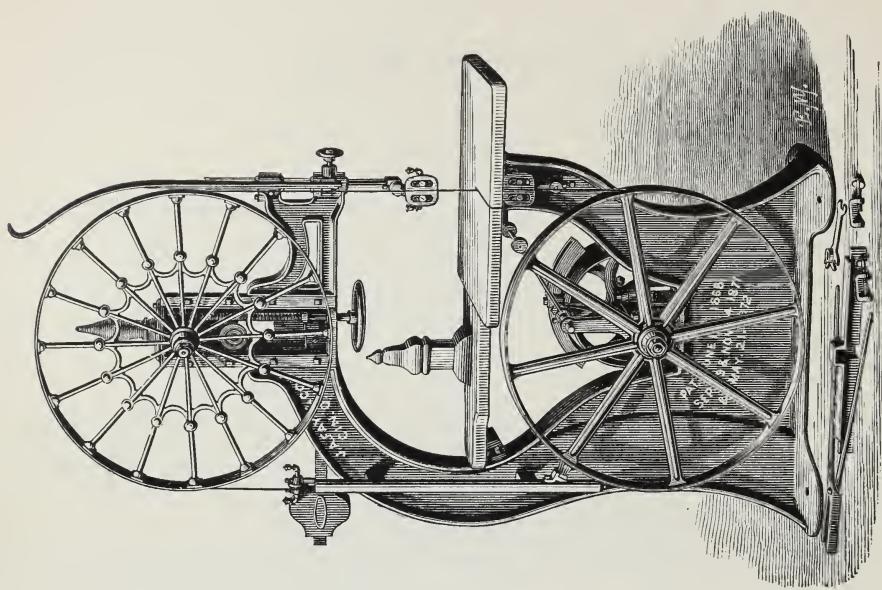
It is cast in one solid frame. Both wheels have flexible coverings and are arranged to be adjusted readily with each other. The upper wheel has a vertical adjustment of eight inches, controlled by a hand wheel and screw, and a novel arrangement for securing the proper support and adjustments. It will saw to the center of sixty-six inches, and to a depth of ten inches.

The vertical guide bar is fitted with Lemman's patent rolling guides, consisting of a hardened steel roller for receiving the back thrust of the saw in combination with lateral supporting side guides, which invention almost entirely overcomes the breakage of saws.

The patent rolling guides, with the lateral supporting side guides, are valuable features, without which no Band Saw Machine is complete or can work as well. They have been supplied to many Band Saws of other makers in place of the worthless guides sent out with their machines, the purchasers invariably reporting that by the use of these guides they have been enabled to reduce the breakage of band saw blades more than fifty per cent.

These improvements are covered by letters patent, and are found only on the J. A. Fay & Co. Band Saw Machines. They will be found complete and perfect in every respect. The price includes one saw. Scarfing frame, tongs, and clamps are furnished at a small cost, when wanted.

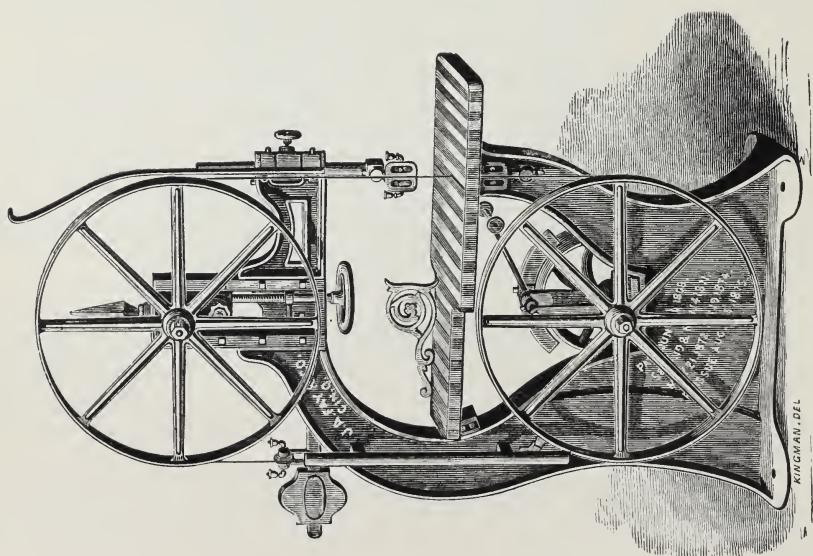
The tight and loose pulleys are fourteen inches in diameter and three-inch face, and should make 375 revolutions per minute.



No. 1

Patent Band Sawing Machine.

(STEEL WHEELS AND IRON TABLE.)



No. 0

Patent Band Sawing Machine.

(IRON WHEELS AND WOODEN TABLE.)

NO. 0 AND NO. 1

Patent Band Sawing Machines.

The band sawing machines represented on the opposite page embody most of the recent improvements perfected by us; and for all ordinary scroll and curve cutting in furniture, sash and door, wheel, plow, and other shops, will be found very advantageous and labor saving.

The No. 0 is a smaller machine than the No. 1, but the general plan of construction is the same, with the exception that the wheels are made of iron, combining lightness with strength. The upper wheel has a vertical adjustment of eight inches, the table is made of ash and black walnut glued together to prevent warping; and when desired it can be arranged for bevel sawing.

The No. 1 machine has the patent elastic steel wheel, with a vertical movement of eight inches, controlled by hand wheel and screw, which, from the lightness of its construction, greatly reduces the strain upon the saw consequent upon starting and stopping.

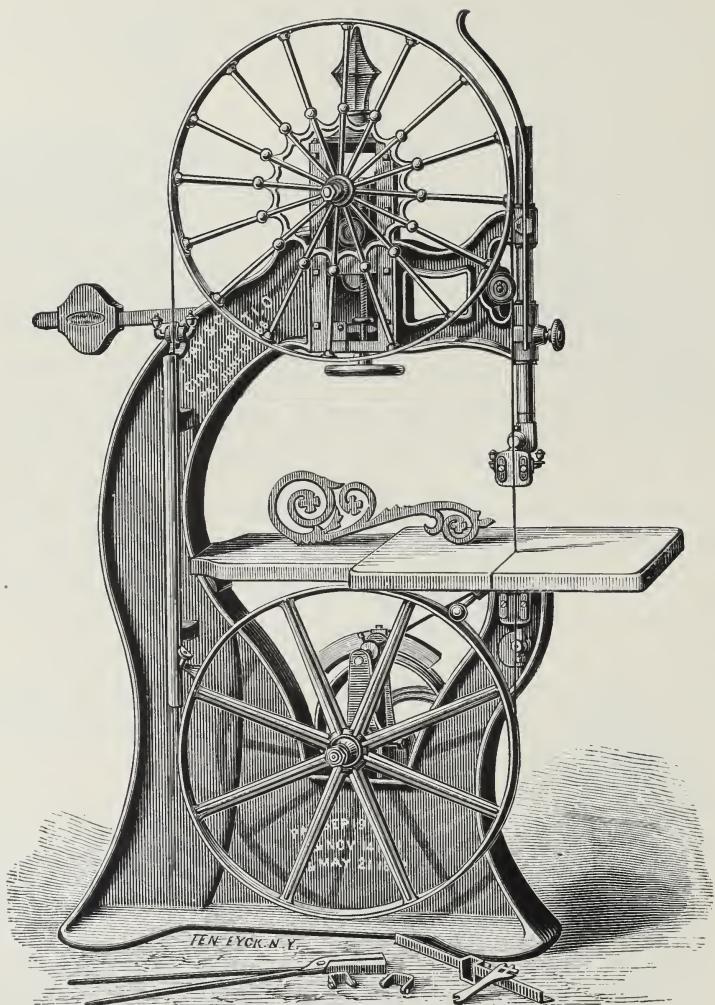
The vertical guide bar, which receives the pressure of the work, is provided with an anti-friction roller of hardened steel. This receives the back thrust of the saw in revolving, and relieves the back of the saw of all friction, which, in machines not provided with this device, is a fruitful source of the breakage of saws.

A roller of similar character is placed below the table, each of which has attached wooden guides for directing the saw on the sides. The table is planed perfectly true, and can be tipped to an angle of thirty degrees for bevel sawing.

The weighted lever which supports the upper wheel and creates the necessary tension of the saw, in combination with the rubber coverings of the wheels, furnishes a most complete compensating arrangement for any changes in the length of the saw by heat or sudden jars against some harder portion of the wood or greater pressure of the operator.

The lower wheel is of cast-iron, secured to its shaft by a large nut, and has all needed adjustments for any wear in its parts. It has the patent shipper for the belt, and the frictional break for quickly arresting the motion of the saw. There are proper guards to prevent striking the saw while in operation, and all parts for adjustment are convenient to the operator. These machines being lighter in weight than the other sizes, are desirable ones for shipment to long distances.

The tight and loose pulleys on the No. 0 are fourteen inches in diameter and three-inch face, on the No. 1 fourteen inches in diameter and four-inch face, and should make 375 revolutions per minute.



No. 2

Patent Band Sawing Machine.

(WITH PATENT ELASTIC STEEL WHEEL.)

NO. 2

Patent Band Sawing Machine.

(WITH ELASTIC STEEL WHEEL.)

This is a heavier machine than the No. 1, and embodies all our labor-saving features and improvements for general band sawing in furniture, wagon, sash and door, agricultural shops, etc., and is strongly recommended for all classes of work. All the improvements that experience and skill could suggest have been incorporated to increase its capacity.

The column of the machine is cast in one piece with flanges upon the corners, giving great strength, and preventing vibration when in operation, and insuring a certainty, that when once properly adjusted in position it will remain so.

It has the patent elastic steel wheel on the upper shaft, which, from the lightness of its construction, greatly reduces the strain on the saw consequent upon starting or stopping.

The lower wheel is of cast iron, combining in its design lightness with great strength. The shafts are of the very best cast steel, run in patent self-oiling boxes, with necessary adjustments to take up the wear.

The patent weighting attachment gives a positiveness to the amount of tension the saw is receiving, at the same time compensating for any variation in the length of the saw by a change in temperature or strain.

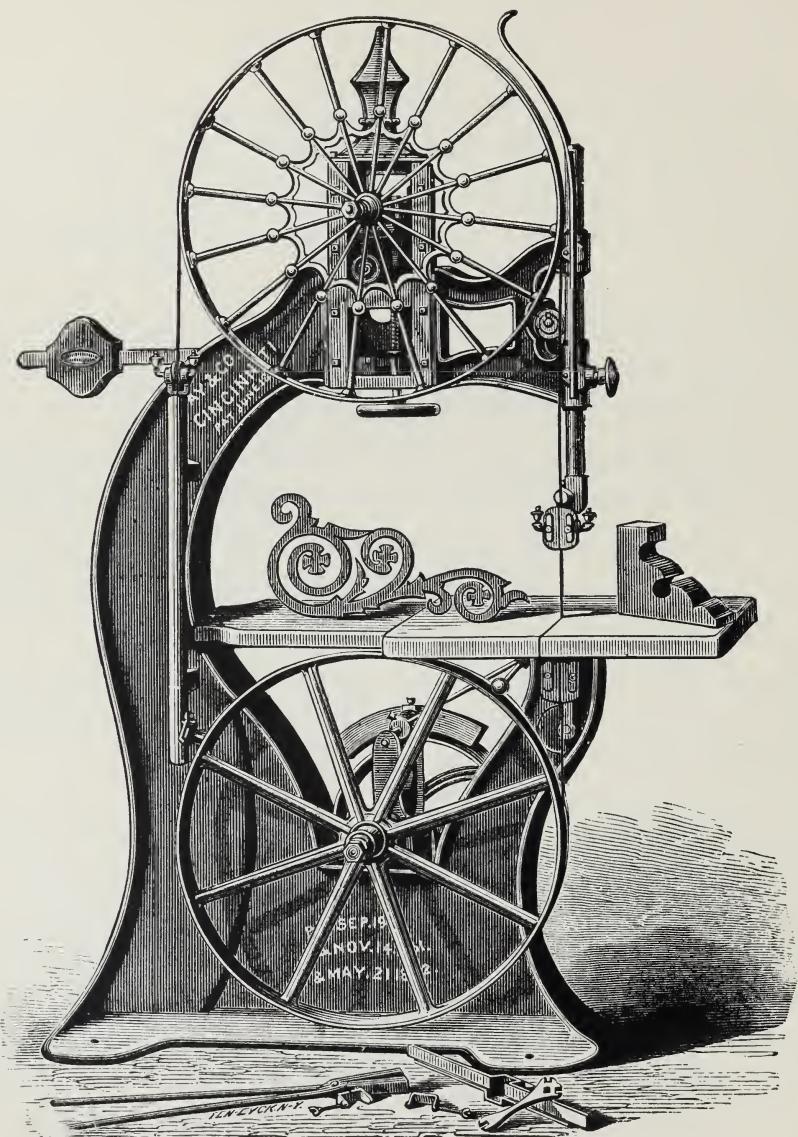
A very important feature is the manner of retaining the saw at its proper tension, allowing at the same time some flexibility of the parts to compensate for any sudden impact, and to prevent breakage of the saw by buckling or friction on the back or side.

The patent rolling guides to receive the back thrust of the saw with lateral supporting side guides are features without which no machine can be successfully operated.

The vertical guide bar is provided with a retracting spring for instantly adjusting it to the desired width, and planed iron table pivoted for bevel sawing. The upper wheel has an arrangement for guiding the saw to the center or any desirable part of the face to accommodate different widths of saws. Both the wheels are covered with heavy rubber ground true.

The patent shipper and brake for quickly arresting the motion of the machine is attached to the frame with the shipper handles, convenient to the operator. Each machine is supplied with one Perin saw blade, brazing tools, wrenches, tongs, etc.

The tight and loose pulleys are fourteen inches in diameter and four-inch face, and should make 375 revolutions per minute.



NO. 3
Patent Band Sawing Machine.

(WITH PATENT ELASTIC STEEL WHEEL.)

NO. 3

Patent Band Sawing Machine.

(WITH PATENT ELASTIC STEEL WHEEL.)

This is our largest band saw machine for curved work. It is intended for the heavier work of agricultural and car shops, navy yards, etc., and embodies all the recent improvements perfected by us, making it a superior machine for any work it may be required to perform.

It is very heavy and strong, the column is cast with cored sections in one piece having flanged corners to insure greater stiffness, so that when once properly adjusted is not easily disarranged, and is fully capable of doing any work within its capacity, our aim having been to introduce features that would overcome the breakage of blades, increase the production, enlarge the capacity, and lessen the cost of machines—how well we have succeeded we leave for the intelligent public to determine.

It is provided with all the recent improvements, viz. :

The patent elastic steel wheel on the upper shaft.

The patent weighted compensating lever to give the saw proper tension.

The patent shipper and brake attachments for arresting the motion.

The swinging table for sawing to a bevel of thirty degrees.

The patent anti-friction rollers and guides for receiving the back thrust of the saw above the work and below the table.

The retracting spring for the vertical adjustment of the guide bar.

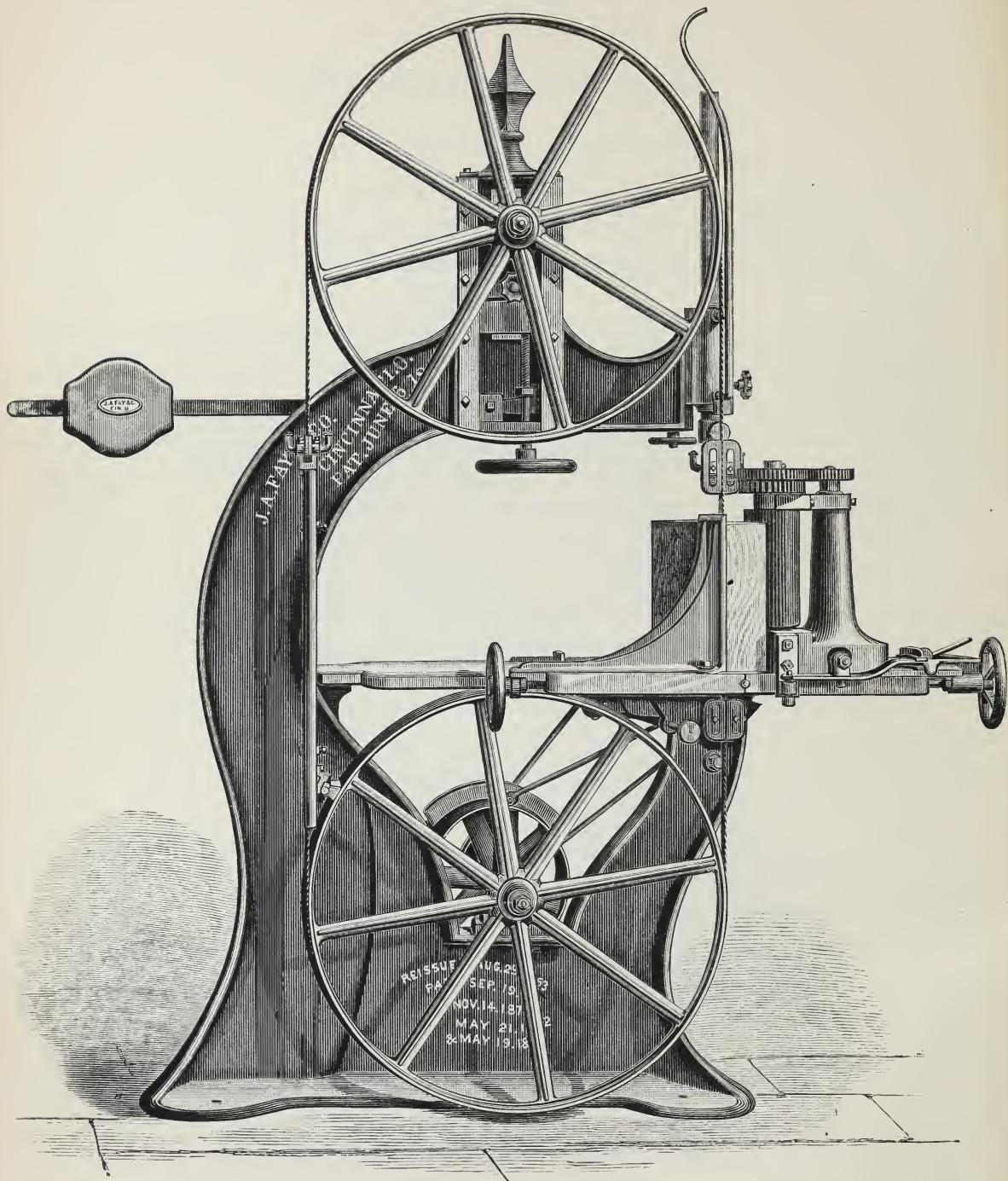
The roller for guiding the saw to the top wheel.

The canting arrangement, for the upper wheel, for adjusting to different widths of saws and for directing their course on the wheels, more or less from a vertical line, as the saw may need.

The wheels of this machine are very large in diameter, and covered with rubber ground perfectly true. The guide bar can be raised to take in lumber thirteen inches thick, and the full width of space between the blade of the saw and the column can be utilized for sawing short curves or wide lumber.

These improvements and attachments are indispensable for the perfect working of a band saw. They are secured by letters patent, and found only on the J. A. Fay & Co. band sawing machines, a more extended description of which has been previously given on pages 164 and 165.

The tight and loose pulleys are fourteen inches in diameter and five-inch face, and should make 350 revolutions per minute.



NO. 4
Patent Band Re-Sawing Machine.

(WITH FRICTION FEED WORKS.)

N.O. 4

Band Re-Sawing Machine.

The accompanying illustration is a correct representation of our No. 4 Band Saw with power feeding mechanism, intended for light re-sawing, such as panel and box work, also for curve sawing. The column is from our largest pattern, and is designed to take on saws to two inches in width.

The wheels are both of cast iron, and of large diameter; their surfaces are covered with rubber to give elasticity under the contact of the saw blade. The upper wheel is arranged to raise and lower for variations in lengths of blades, and has the weighted lever attachment for compensating for changes in lengths from various causes.

It has the patent brake and shipper, and the idler roller for guiding the blades on the upper wheel. The upper wheel has the adjustment for retaining the saw in its proper course over the pulleys.

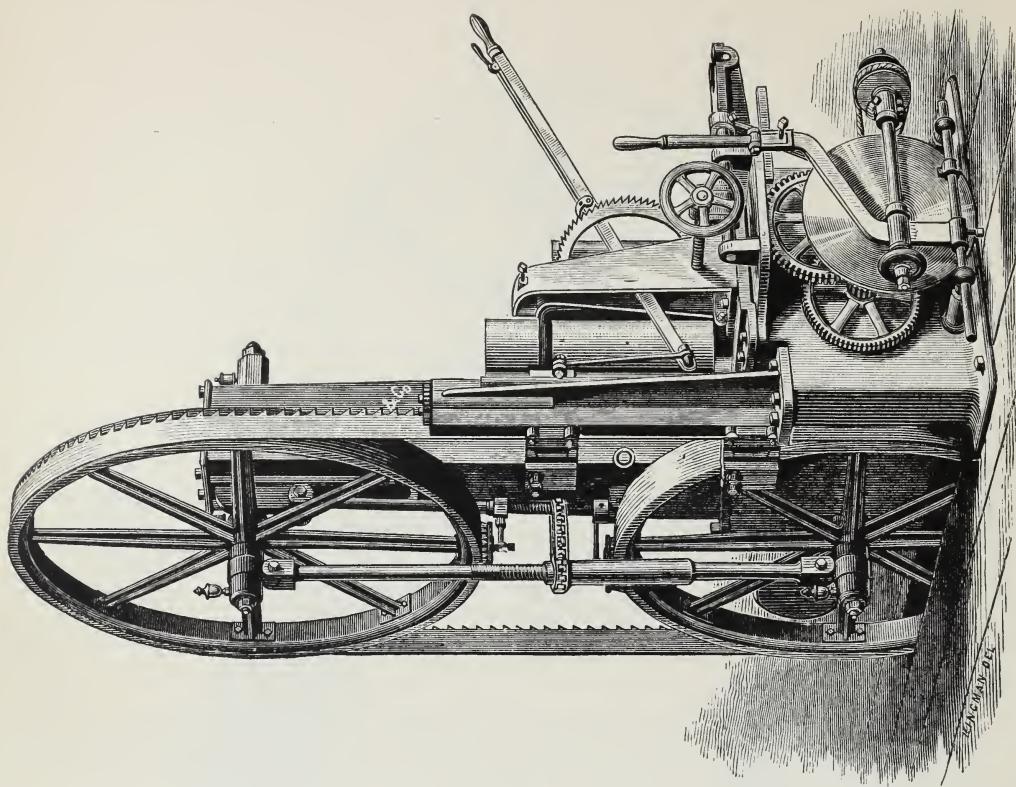
The vertical guide bar is provided with the retracting spring for counterbalancing its weight, and an additional arrangement for raising the guide out of the range of all work that will pass under the raising hand wheel. The patent friction roller guides arranged to guide from the teeth can be applied to this machine when desired.

The feed works for re-sawing are mounted on a table, and consist of two feed rollers strongly geared and provided with changes of feed. There is also a graduated friction face plate, which is controlled by a lever, the guide plate is adjustable by a hand wheel for the thickness to be cut, and the feeding rollers are adjustable to and from the guide plate.

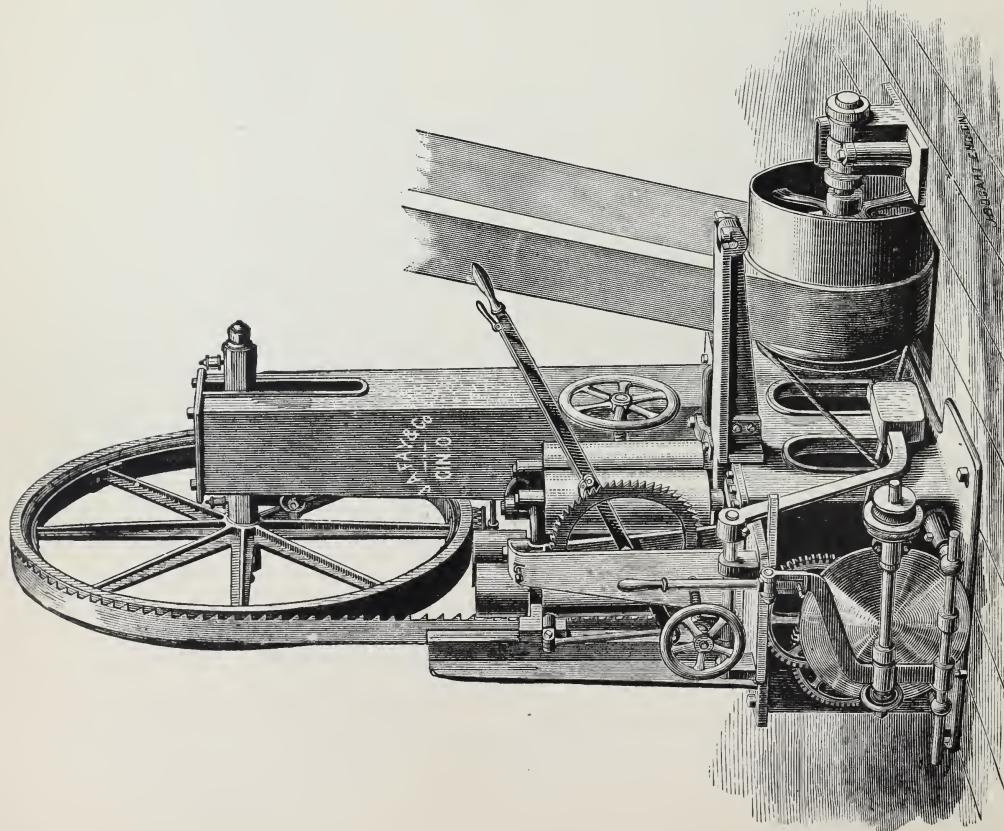
For ordinary curved band sawing a separate table can be supplied at small cost. The table on which the feed works are mounted is arranged to swing for bevel sawing, and it can be removed and the regular table applied in five minutes without the removal of a single screw.

This machine will re-saw to fourteen inches in width, and for establishments requiring an amount of work equal to its capacity it will be found a valuable addition.

The tight and loose pulleys are fourteen inches in diameter and five-inch face, and should make 350 revolutions per minute.



(REAR SIDE VIEW.)



(OPERATING SIDE.)

Large Size Patent Band Re-Sawing Machine.

Large Patent Band Re-Sawing Machine.

For re-sawing lumber into panel boards, or reducing deals to lumber, we have designed and constructed the band re-sawing machine illustrated on the opposite page. This machine is one of the heaviest of its class, and will saw through thirty inches wide, and in the center of eighteen inches, or down to the very thinnest material that admits of re-splitting. The thickness of the saw blade, with the necessary set to the teeth, does not exceed one-sixteenth of an inch, consequently a great saving of material is accomplished. The machine is adapted to re-saw either hard or soft wood, and in its construction arrangements have been made for such changes as may be necessary to accomplish it in the very best manner. The saw kerf being only one-sixteenth of an inch thick, a saving of twenty per cent in lumber is effected, shown by the fact that by the use of our machine, two $\frac{3}{8}$ inch panels, planed on both sides, can be produced from one-inch lumber, whereas by other methods $1\frac{1}{4}$ inch lumber is required.

The wheels are five feet in diameter and will take on saws to four inches in width. They are placed as close together as possible to use a short saw, and bring the guide supports as near each other as will permit the desired size of stick to pass between the saw pulleys, thus leaving but little of the saw blade unsupported or subject to unnecessary vibration.

The wheels are made with iron centers and wooden rims, covered with rubber or leather, and are placed upon heavy journals running in long, self-oiling bearings. The upper wheel is adjustable vertically for different lengths of saws, and can be turned on an angle to the lower wheel to direct the saw to any desirable part of the face of the wheels.

The feeding rollers are connected by gearing, all four rollers being driven. The gearing is driven by a face friction at the end of the machine, the friction plate being driven by a small friction wheel which has two changes of feed. The feed is graduated by means of these two changes, and passing the small friction wheel over the friction plate, giving speeds from five to twenty-five feet per minute. The feeding arrangement is governed by a lever by which the feeding is started gradually or stopped.

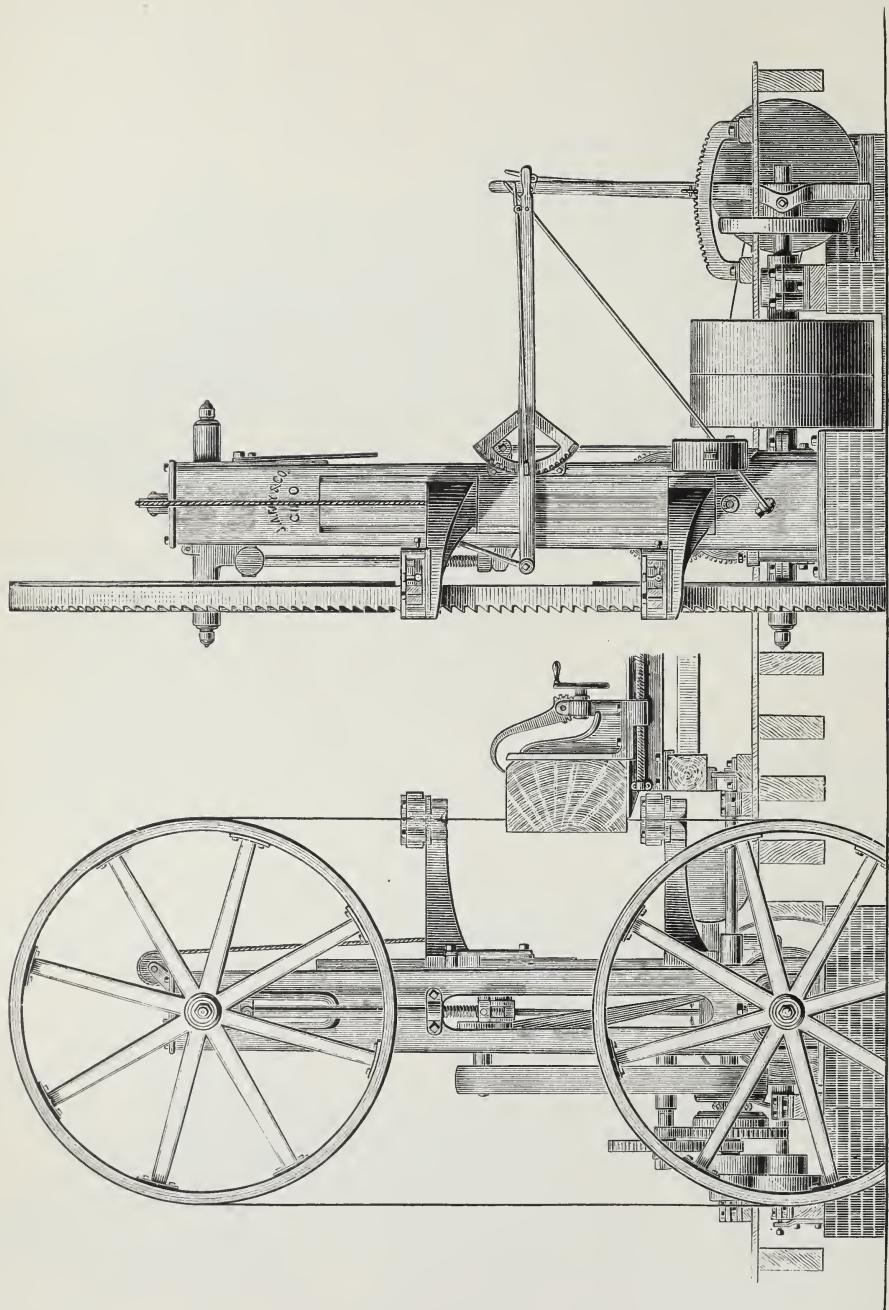
Both pairs of rollers are adjusted by screws and hand wheel, the pressure rollers receiving their force from a heavily weighted lever attached to their moving screw, the pressure between the rollers being sufficient to retain the boards straight as they pass through.

The saw is guided by our patent friction roller guides, the roller supporting the back of the saw, the sides being supported by adjustable wooden side guides, with an arrangement by which the saw is directed from the teeth. The guides are gibbed to a post, the upper one being adjustable for different widths of lumber, and is raised and lowered by a lever. Both guides can be removed to allow the saw to be taken off.

The saw is strained by a combination of levers, the weight being close to the floor, and causes no vibration to its movements. The strain of the saw is evenly distributed on the bearings by an outside bearing, which has flexibility in its adjustment to compensate for any movement of the weighted lever.

Outside connection, one saw blade and full set of wrenches, foundation plan, and directions for setting up accompany each machine.

Tight and loose pulleys are thirty inches in diameter and eight-inch face, and should make 300 revolutions per minute.



Patent Band Saw Mill.

(FOR LOGS.)

Patent Band Saw Mill.

(FOR LOGS.)

This machine is designed for sawing lumber directly from the log, and is furnished with all the attachments of an ordinary log saw mill, having a carriage, tracks, head blocks, etc., complete, and is intended for economical production of expensive lumber by the saving in the saw kerf, and the smoothness of the product in wide lumber.

The wheels over which the band saw moves are constructed with an iron center and wooden rim. They are placed on heavy shafts supported on iron columns, the whole machine set upon a foundation of brick or stone work.

The lower wheel is driven, the shaft having tight and loose pulleys on it. The upper shaft with the upper wheel is adjustable vertically for different lengths of saws, and has a compensating device for retaining the saw at the proper tension and to prevent its variation from any course.

The upper wheel can also be turned to an angle with the lower wheel by a lever operating a cam, which movement directs the saw to any desired point on the face of the wheel. The upper wheel is raised and lowered by a screw having sufficient movement to allow a variation of two feet in the length of the saws.

The patent saw guides are automatic in their action of directing the saw, being hung to swing from the points of the teeth of the saw, any tendency of the saw to run from a straight line being immediately counteracted by the movement of the guides. The guides have our patent friction rollers and adjustable wooden side guides.

The lower guide is fixed in its position. The upper guide is adjustable vertically to take in logs to forty-two inches in diameter. The upper guide is operated by a lever and counterbalanced.

The feeding works of the log carriage are operated by a lever, by which the feeding is started, reversed, or stopped. The speed is graduated by a face plate, also operated by a lever. The movement of the carriage is changed by the lever in its forward movement from five feet to twenty-five feet per minute.

The log carriage is run upon friction rollers, and is furnished with the most approved head blocks, which adjusts the log to any desired thickness with the greatest accuracy.

The tight and loose pulleys are thirty inches in diameter and eight and one-half-inch face, and should make 300 revolutions per minute.

Special Announcement.



"KNOW ALL MEN BY THESE PRESENTS: That we, Perin, Panhard & Co., of Paris, France, have this day withdrawn the agency for the sale of our band saw blades from Messrs. Richards, London & Kelley, and Messrs. London, Orton & Berry, successors to Messrs. Richards, London & Kelley, of Philadelphia, Pa., and appoint Messrs. J. A. FAY & CO., of Cincinnati, Ohio, U. S. A., to be our sole and exclusive agents for the entire States and Territories, with full power to prosecute all infringements and illegal abuse of our trade mark."

*Made in Paris, France, Jan. 1, 1878.
Witness: W. TARAZIN.*

*PERIN, PANHARD & CO.,
Successors to PERIN & CO.*

In order to supply our machines and customers with the very best blades that can be found, we have entered into a contract with Messrs. Perin, Panhard & Co., of Paris, France, for the sole and exclusive agency of the United States and Territories, of their celebrated band saw blades, with full power to prosecute all infringements and illegal use or abuse of the trade mark, which we shall be prompt to do, as the genuine "Perin" saw blades can only be procured from us or our authorized agents.

The chief requisites of band saw blades are uniformity of temper, width, and thickness, a perfect joint, and freedom from all flaws. They are liable to break from crystallization, imperfect tension, or carelessness of the operator in handling; and as a certain degree of temper is required for springs made of fine steel, so is the same temper necessary in band saw blades to insure durability and efficiency.

Band saw blades not having uniformity of temper, width, and thickness, perfect joints, and free from flaws, are expensive at any cost, while a perfect saw is sure to satisfy both purchaser and user in the amount of work it performs and smoothness of its movement.

The appearance of a band saw blade does not indicate its temper, and it is difficult to distinguish tempered from untempered saws. A soft saw is comparatively worthless, as it will not retain its cutting edge. The best and surest test is to bend the blade, and see if its elasticity indicates temper.

The blades manufactured by Messrs. Perin, Panhard & Co., of Paris, France, are not injured by this test, but have invariably proved to be the most perfect and durable, outlasting three or four ordinary blades.

We shall carry a large variety of sizes in stock, and orders will be filled in turn. Frequent importations will be made, and special orders for blades of any other size or length than those quoted in our list can be furnished in lots of not less than one dozen each size, in about forty days from receipt of such order, this being the quickest time possible to deliver them. Large saws for re-sawing purposes will require a longer time.

Our list will be found to comprise those which are joined, set, and filed, and those which are not. Persons requiring any special form of tooth will need to send diagram, and also state thickness or gauge.



Perin French Band Saw Blades.

The accompanying price-list embraces both finished and unfinished saws. The former are joined, set, and filed, ready for use. The latter are ground and toothed, but not joined, filed, or set. The prices, it will be seen, are but little more than is asked for the common band saw blades. The finished saws are joined, set, and filed in Paris in so perfect a manner that it is difficult to detect the joint. One side of the blades will bear the trade mark, Perin & Co., and the other J. A. Fay & Co., which will be the only sure guarantee that they are genuine.

PRICE LIST.

"Perin" Saws, Joined, Set, and Filed, 17 Feet Long.

Width,	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1 in.
Price,	3 15	3 15	3 15	3 15	3 50	3 85	4 20	4 65	5 00

"Perin" Saws, Joined, Set, and Filed, 17 Feet 6 inches Long.

Width,	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1 in.
Price,	3 30	3 30	3 30	3 30	3 65	4 05	4 40	4 90	5 25

"Perin" Saws, Joined, Set, and Filed, 18 Feet Long.

Width,	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1 in.
Price,	3 30	3 30	3 30	3 30	3 65	4 05	4 40	4 90	5 25

"Perin" Saws, Joined, Set, and Filed, 20 Feet Long.

Width,	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	2 in.	
Price	3 75	3 75	3 75	4 20	4 60	5 00	5 55	5 95	7 20	8 20	12 00

"Perin" Saws, Joined, Set, and Filed, 22 Feet Long.

Width,	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2 in.
Price	4 05	4 05	4 50	4 95	5 40	6 00	6 45	7 80	8 85	13 00

"Perin" Saws, Joined, Set, and Filed, 23 Feet 6 inches Long.

Width,	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2 in.
Price,	4 35	4 35	4 85	5 35	5 80	6 45	6 95	8 40	9 50	14 00

"Perin" Band Re-Saw Blades, Joined, Set, and Filed ready for use.

Width of Blade,					$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	
Price per foot for No. 18 gauge thick and under,					80c	95c	1 10	1 40	
" " " " 17 " "						1 20	1 40	1 65	

UNFINISHED PERIN SAWS.

Ground and Toothed, not Joined, Set, or Filed, 18 Feet Long.

Width,	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1 in.
Price,	1 90	1 90	1 90	1 90	2 25	2 60	3 00	3 50	3 90

"Perin" Saws, not Joined, Set, or Filed, 20 Feet Long.

Width,	$\frac{1}{8}$	$\frac{3}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1 in.
Price,	2 10	2 10	2 10	2 10	2 50	2 90	3 35	3 90	4 30

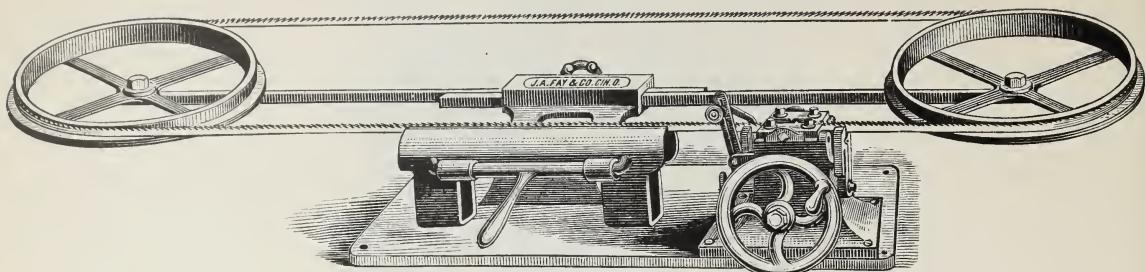
"Perin" Saws, not Joined, Set, or Filed, 22 Feet Long.

Width,	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$
Price,	2 25	2 25	2 70	3 15	3 60	4 20	4 65	6 00	7 00

"Perin" Band Re-Saw Blades, not Joined, Set, or Filed.

Width of Blade,					$2\frac{1}{2}$	3	$3\frac{1}{2}$	4 in.
Price per foot for No. 18 gauge thick and under,					65c	85c	1 00	1 25
" " " " 17 " "						1 20	1 40	1 65

Saws of other widths and lengths not included in the above lists will be imported to order, and prices given on application.



J. A. Fay & Co.'s Band Saw Setting and Filing Machine.

The above ingenious device supplies a want which has long been felt for a machine that would set band saws with rapidity and accuracy, and is the only one which will successfully perform the work.

It is strong and durable, will work any length saws, can be quickly changed to set fine or coarse teeth, and to give more or less set, as required. It will set an ordinary band saw blade in three minutes, more accurately than can be done by hand in one hour.

This little machine will save its cost in a short time, as the superior manner in which it performs the work prevents considerable breakage of saws. It will be found indispensable in a shop where band sawing machines are used, and we offer it to the public in the confident belief that its merit can not fail to be appreciated.

DIRECTIONS FOR OPERATING THE MACHINE.

The saw being placed upon the wheels, set them far enough apart to straighten the saw. Put the saw between the jaws of the Setting Machine, and loosen the set screws so as to allow the dies to slip back out of the way.

Adjust the feed pawl so it will feed two teeth, and feed on one of the teeth being set. Turn the hand-wheel until the cam is at its extreme throw and the jaws as close together as they will go, then push in the wedges shown in the cut as hard as can be done with the hand, which will pinch the saws hard enough in most cases.

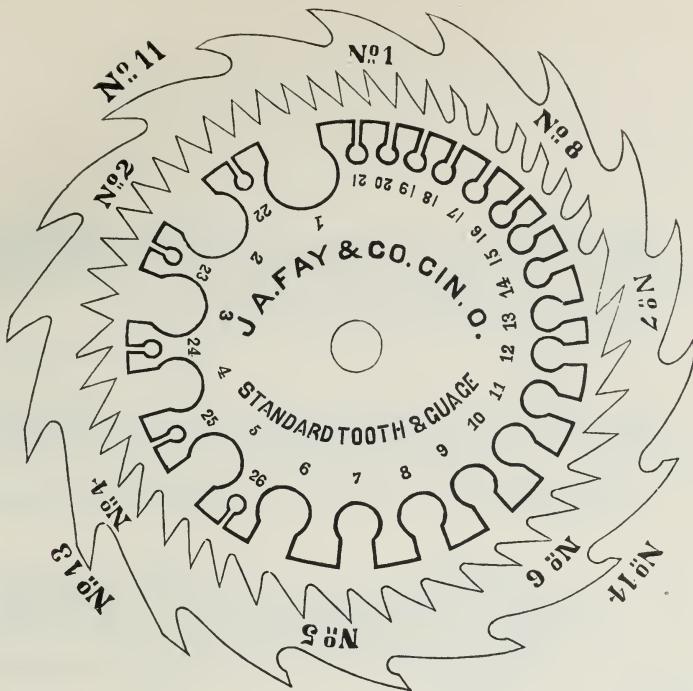
Set the dies on the points of the teeth, and adjust them with the set screws on top. Keep the saw down between the jaws as low as possible. This will set the points of the teeth over without bending them at the roots, preventing the warping of the saw, which is liable to occur when setting saws by hand. Keep the lower ends of the cam levers well oiled.

SPECIAL ROUND CORNER BAND SAW FILES.

These files are prepared with special round corners to avoid leaving a sharp angle between the teeth, which is a serious cause of breakage.

PRICES AND SIZES PER DOZEN.

4½ inch.	5 inch.	6 inch.	7 inch.
\$2.50	\$2.75	\$3.00	\$3.50



Standard Shape and Gauges of Circular Saws.

The above diagram illustrates and numbers not only the standard styles of saw teeth for rip and cross-cut saws, but gives the standard gauge, showing the thickness.

Gauge No. 4 is $\frac{1}{4}$ inch scant.

" No. 5 is $\frac{7}{32}$ "

" No. 6 is $\frac{3}{16}$ " full.

" No. 7 is $\frac{3}{16}$ " scant.

" No. 8 is $\frac{5}{32}$ "

Gauge No. 9 is $\frac{5}{32}$ inch scant.

" No. 10 is $\frac{1}{8}$ " full.

" No. 11 is $\frac{1}{8}$ " scant.

" No. 12 is $\frac{3}{32}$ " full.

" No. 16 is $\frac{1}{16}$ "

In ordering circular saws, be careful to follow the above diagram, giving the size, gauge, number, and shape of teeth, if you have any preference, size of arbor hole, and whether for rip or cross-cutting.

Diam. of Saw.	Rev. per minute.						
8 inches.	4500	16 inches.	2250	24 inches.	1500	32 inches.	1125
10 "	3600	18 "	2000	26 "	1384	34 "	1058
12 "	3000	20 "	1800	28 "	1285	36 "	1000
14 "	2585	22 "	1636	30 "	1200	38 "	950

We carry in stock a full assortment of both fret and taper webs, of the following sizes: from thirteen to seventeen gauge in thickness.

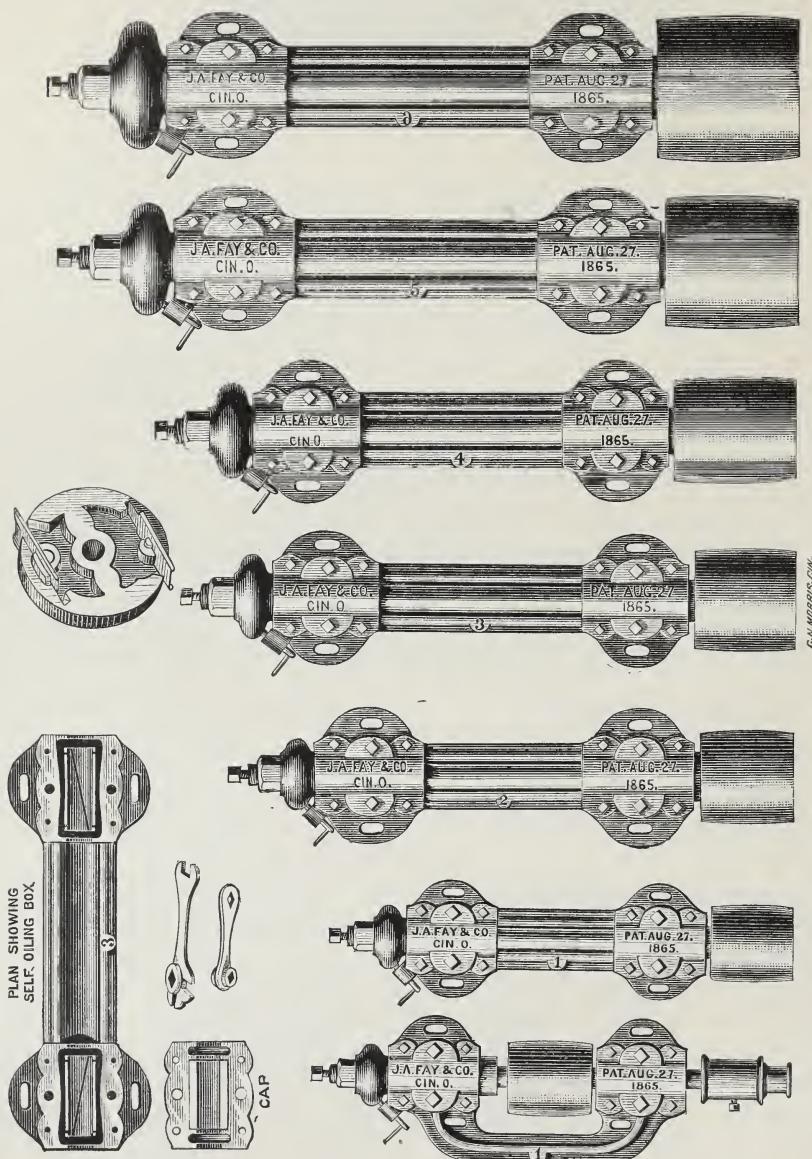
FAY & CO.'S PATENT SCROLL SAWS.

8 inch	\$-----
10 "	\$-----
12 "	\$-----
14 "	\$-----

FAY & CO.'S PATENT FRET SAWS.

$\frac{1}{4} \times 12$	\$-----	$\frac{1}{4} \times 14$	\$-----
$\frac{3}{8} \times 12$	\$-----	$\frac{3}{8} \times 14$	\$-----
$\frac{1}{2} \times 12$	\$-----	$\frac{1}{2} \times 14$	\$-----

Over three-fourths inch wide, extra price.



Patent Self-Oiling Saw Arbors.

(WITH EXPANDING DEVICE.)

Patent Self-Oiling Saw Arbors.

The accompanying engraving is a correct illustration of our patent saw arbors, constructed from new patterns, and of an improved form. The bearings are cast on a solid bed, connecting the two together in such a manner as to render it impossible for them to get out of line.

They are self-oiling, having a chamber at each end connected by a recess extending diagonally through the lining of the box, in which is placed felt or cotton wicking, through which the oil is conducted to the journal, whence it works back to the chamber, thus keeping up a constant circulation of oil, so that its lubricating properties are fully employed. These patent self-oiling bearings effect a saving of at least fifty per cent in oil and labor.

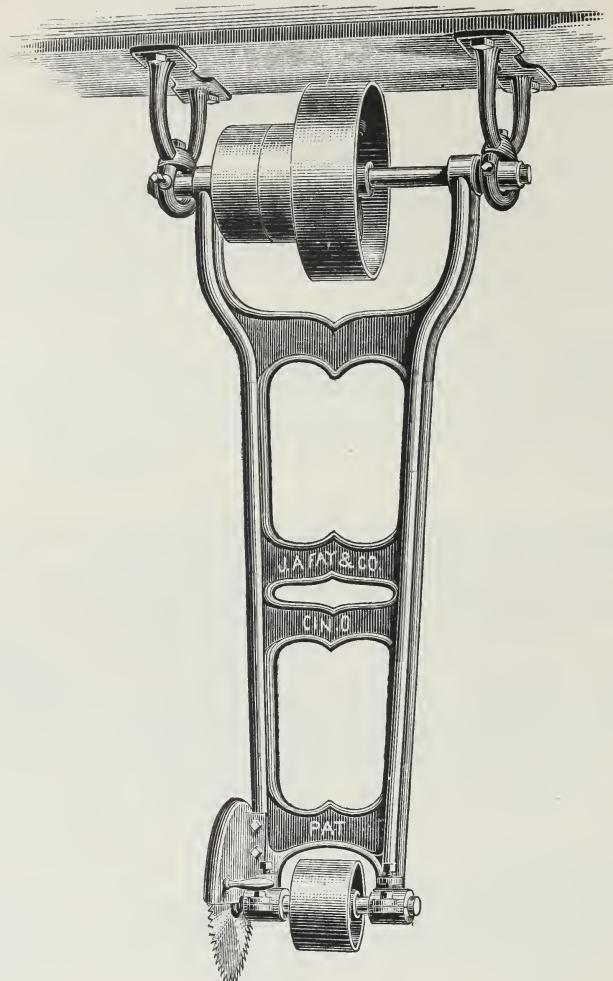
The arbors are made of best refined cast steel, and the pulleys arranged so as to take up the wear, and prevent any end motion. These arbors are also furnished with an expanding device, operated by means of a screw at the end, enabling the operator to use saws with different size holes, without the necessity of bushing them, and are also provided with safety device for locking the arbor, to prevent its turning while attaching or removing the saw, by simply turning a pin lever.

When desired for combined sawing and boring, we arrange Nos. 1, 2, and 3 with a boring head on opposite end of arbor, as shown in cut. Our expansion groover heads, illustrated on page 131, this book, can be used on any of the arbors.

They are made of six different sizes, with the pulley at the end or between the bearings, as customers may prefer, and furnished with one steel and one wrought iron wrench.

DIMENSIONS AND PRICES.

NO.	Extreme Length from out to out of Journals.	Diameter of Pulleys.	Face of Pulleys.	Diameter of Collars.	Diameter of Arbor.	Size of Hole in Saw.	For Saws under inches	PRICE.
1	15	3½	4	2¾	1	⅞	10	\$17
2	18¾	4	4½	3¼	1⅛	1	15	19
3	20½	5	5	4	1¼	1⅓	20	21
4	20½	5	6	4½	1¾	1¼	24	23
5	24	6	6	5	1½	1¾	30	28
6	24	6½	7	5½	1½	1¾	36	33



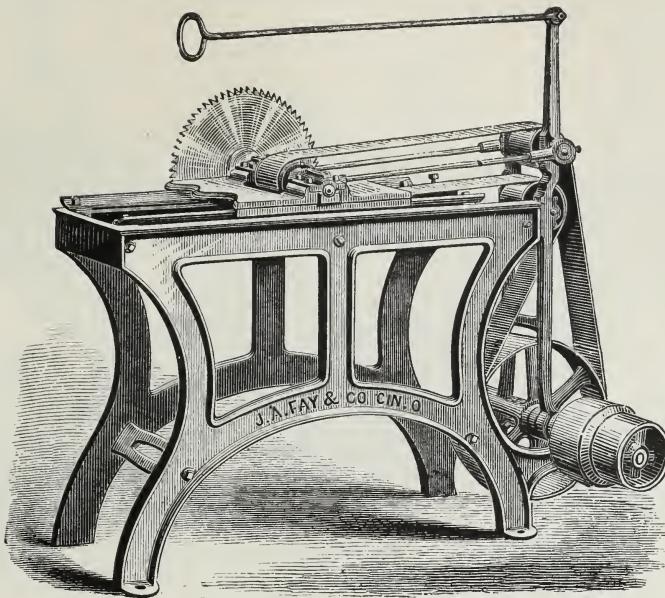
Improved Swing Cut-Off Saw.

This is a very complete machine, and extensively used for cutting up all kinds of rough stock, ready for working, in door and sash, agricultural, furniture and box shops, planing mills, etc.

It is made wholly of iron and steel, consisting of a frame, having an arbor and saw at the lower end, and countershaft and pulleys at the top, arranged to be attached to the floor above. It is very convenient and handy, occupies but a small space, requiring very little skill to operate and keep it in order.

It is furnished with one of our patent self-oiling saw arbors, with expansive mandrel to suit different size holes in saws without the necessity of bushing them. The saw is protected by a shield, and the machine is complete and can be set up and put in operation in a few minutes. We furnish two sizes, the smaller, $6\frac{1}{2}$ feet, the larger $7\frac{1}{2}$ feet long from the center of arbor to base of hanger.

It is supplied with the patent tight and loose pulleys, which are ten inches in diameter and five-inch face, and should make 500 revolutions per minute.



NO. 1

Railway Cutting-off Saw.

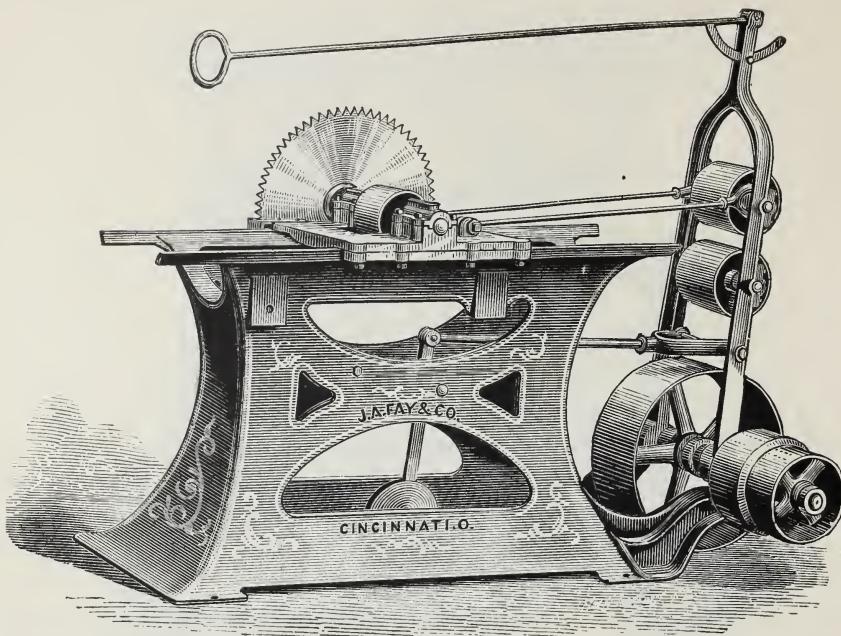
THE above engraving is a representation of our No. 1, Traversing or Railway Cutting-Off Saw. It is well adapted for the cutting up of all kinds of light lumber, and is extensively used in door, sash and blind shops, cabinet and box makers, etc. It is a substantial good tool, for the purposes designed.

The saw arbor is made of refined cast steel, runs in connected patent self-oiling boxes, supplied with our patent expanding device, operated by means of a screw at the end, enabling the use of saws with different size holes, without the necessity of bushing them. The size of the arbor where the saw is attached is $1\frac{3}{16}$ inches.

The gateway carrying the arbor and saw is traversed back and forth by means of the hand lever shown in the engraving, performing the operation of cutting, while the material is at rest.

The arrangement of the vibrating frame is such, that a uniform tension of the belt is always preserved, and the saw driven by the tight part of the belt.

It is supplied with patent tight and loose pulleys, which are eight inches in diameter and four-inch face, and should make 600 revolutions per minute.



NO. 2

Medium Size Patent Railway Cutting-Off Saw.

(WITHOUT TABLE.)

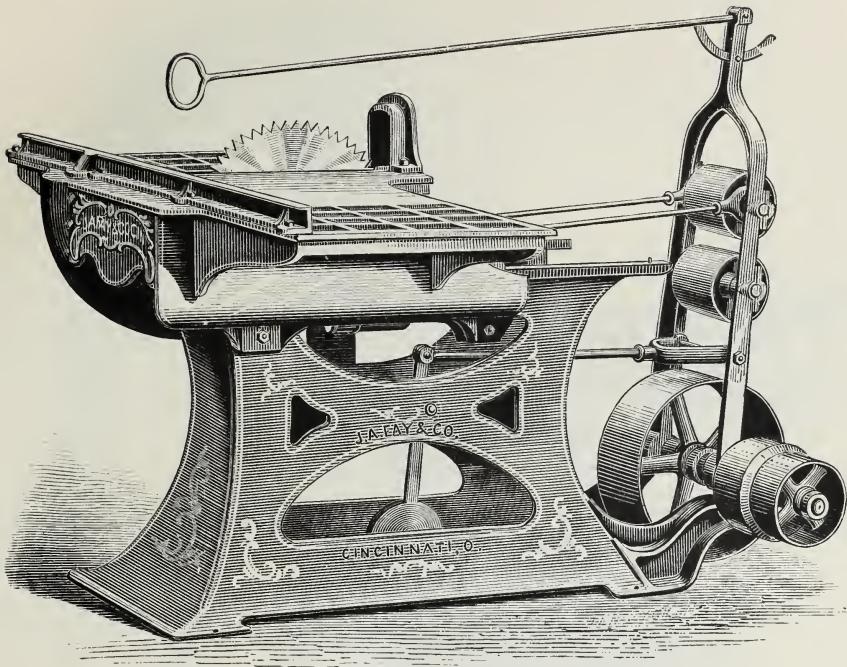
This machine is adapted for cutting up all kinds of light lumber, box stuff, etc., and is in extensive use in cabinet, furniture, sash and door shops, etc., etc.

It is very heavy and substantial, the frame being cast in one piece, with a very broad base, and does not require to be bolted to the floor, rendering it very convenient when it is desired to be moved from one part of a shop to another.

The upper part of the frame takes the form of rails, which support and guide the carriage, carrying the saw in its traverse movement. The arbor is made of best refined cast steel, running in patent connected self-oiling boxes, and the carriage, to which it is attached, traverses on planed slides, and is supplied with a counterbalance.

The arbor is furnished with patent expanding device operated by means of a screw at the end, enabling the operator to use saws with different size holes, without the necessity of bushing them, and is also provided with lock attachment to prevent its turning while attaching or removing the saw.

It is supplied with the patent tight and loose pulleys, which are eight inches in diameter and four-inch face, and should make 600 revolutions per minute.



NO. 2

Medium Size Patent Railway Cutting-Off Saw.

(WITH TABLE.)

This machine is designed for cutting up to lengths all kinds of lumber used in door, cabinet, agricultural and wagon shops, box factories, etc.

The frame is formed of one heavy casting with a broad base, requiring no attachments to the floor, and the machine can readily be moved from one part of the shop to another.

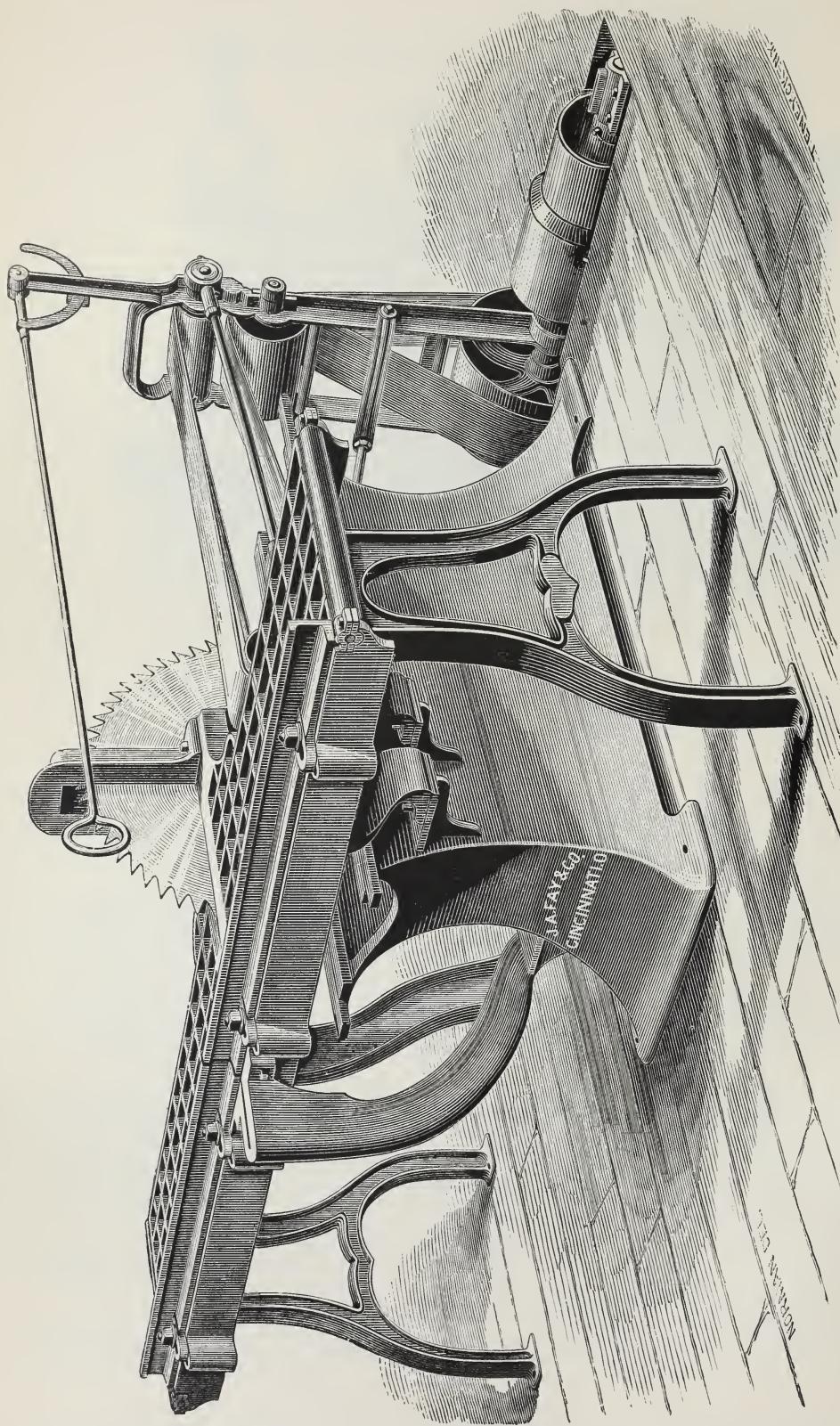
The table is of iron, attached to and made a part of the machine, and is provided with dust spout, safety guard, and board measure, spaced by inches, for the convenience of the operator.

The arbor, made from best refined cast-steel, runs in patent connected self-oiling boxes, is provided with an expanding device, allowing the use of saws with varying sizes of holes, without the necessity of bushing them, and is also fitted with lock attachment, to prevent turning while attaching or removing the saw.

The carriage to which the arbor is attached is traversed on planed guides by means of an adjustable lever, constructed to remain in any desired position.

The vibrating arm is pivoted to the countershaft, and furnished with an adjustable counterbalance.

It has the patent tight and loose pulleys, which are eight inches in diameter, four-inch face, and should make 600 revolutions per minute.



NO. 3

Large Car Railway Cutting-off Saw.

(WITH IRON FRAME AND TABLES.)

NO. 3

Large Car Railway Cutting Off-Saw.

(WITH IRON FRAME AND TABLES.)

This machine is exceedingly strong and heavy, and is constructed in every part in the most thorough manner. The frame is cast in a single piece, and is, as will be seen, of a form best calculated to secure strength and permanency.

It is designed for use in railway and car shops, etc., and in all cases where a reliable and effective machine is required for cutting up timber of large dimensions.

The table is attached to, and made a part of, the machine; and being from six to eight inches lower than on any other railway saw built, it saves considerable labor in the handling of heavy stuff.

It is eight feet in length, and is furnished with floor supports at each end, making it very solid and substantial.

It is also furnished with dust conveyer and board gauge, spaced off into inches, very convenient for the operator in making measurements.

The vibrating pulley frame is so arranged as to maintain a uniform tension of the belt at all times, and is provided with an adjustable counterbalance.

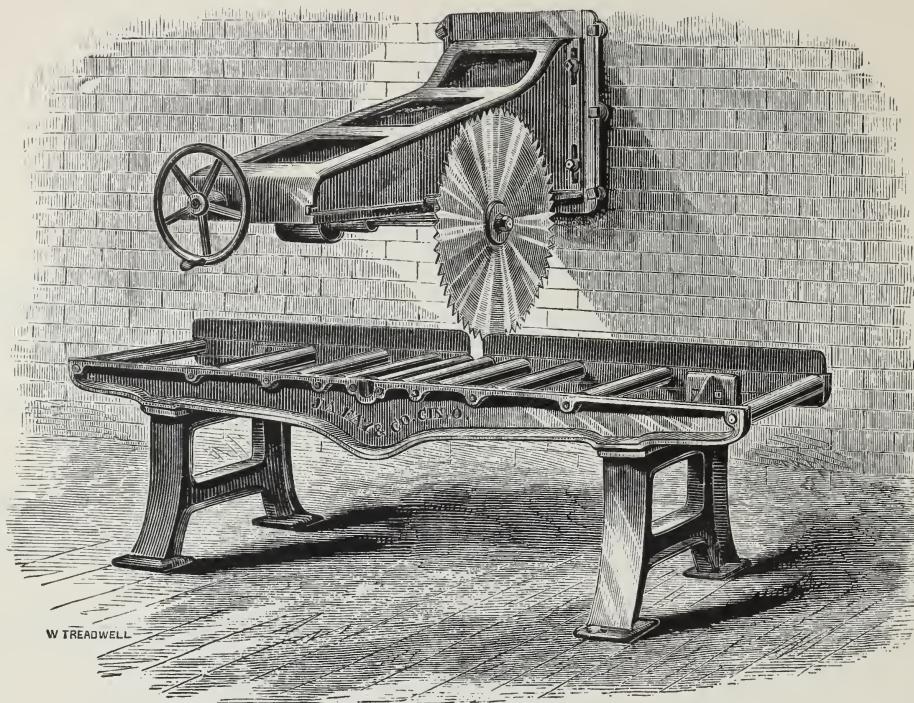
The adjustable lever for moving the saw is so fitted to the frame as to remain in any position most convenient to the operator.

The arbor is attached to a carriage which is traversed on slides, planed on the frame. It is of large diameter, made of best refined English steel, runs in patent connected self-oiling bearings, is provided with an expanding device, allowing the use of saws with varying sizes of holes without the necessity of bushing them.

There is also a safety device for securing the arbor while attaching or removing the saw. The arbor will carry saws up to thirty-six inches in diameter, and cut off stuff up to twenty-four inches wide.

It is provided with countershaft, is complete in itself, and for the heavy work for which it is adapted and intended, will be found unequalled.

It is furnished with the patent tight and loose pulleys described on page 16, which are ten inches in diameter and eight-inch face, and should make 600 revolutions per minute.



Improved Bracket Cutting-Off Saw.

(WITH TRAVERSING ARBOR.)

This machine is designed, in all its parts, to endure the strains it may receive in cutting off or handling heavy timbers, that are required in car and bridge shops, navy yards, etc.

The table is low, arranged with wrought iron friction rollers to facilitate moving the timber with ease, and is provided with a fixed fence at the back to retain the timber at right angles to the saw when cutting.

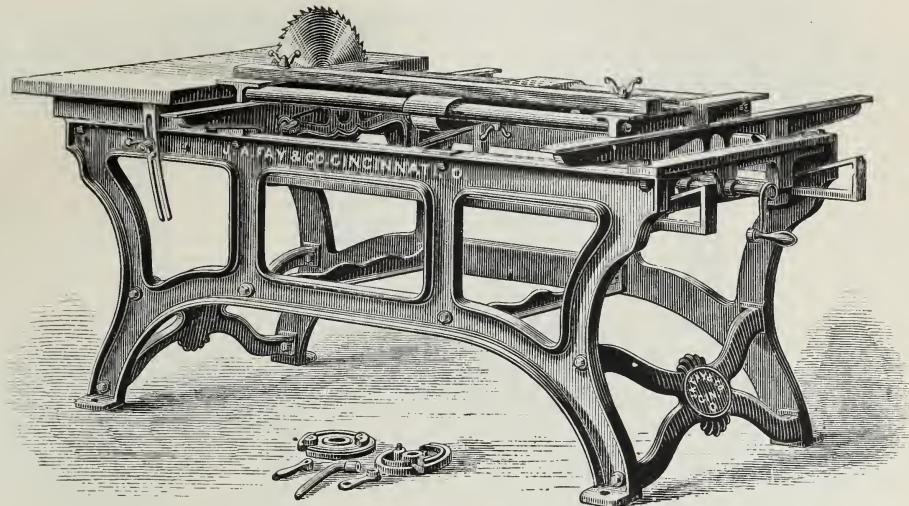
The bracket, to which the ways are attached that the carriage slides upon, is bolted to a heavy plate fastened to the wall or other support, and is adjustable vertically, to compensate for the wearing away of the saw.

The carriage which carries the saw arbor is gibbed to the ways, and, by means of a rack and pinion connected with the hand wheel in front, has a traverse movement over the table of thirty-eight inches. Its sawing capacity for boards is to thirty inches in width, and for timbers to twelve inches thick by twenty-four inches wide.

The countershaft is placed vertically above the center of the travel of the carriage carrying the arbor, leaving the floor clear of all obstructions. Saws of any size, up to thirty-six inches in diameter, can be used.

The wall plate and face of the bracket are planed together so that, as the bracket is lowered to take up the wear of the saw, it remains perfectly true with the table.

The tight and loose pulleys are fourteen inches in diameter and eight-inch face, and should make 390 revolutions per minute.



Improved Carriage Cutting-Off Saw.

This is a very convenient machine for cutting up sash and door stuff, panels, boxes, and other lumber that requires to be cut square and to accurate lengths.

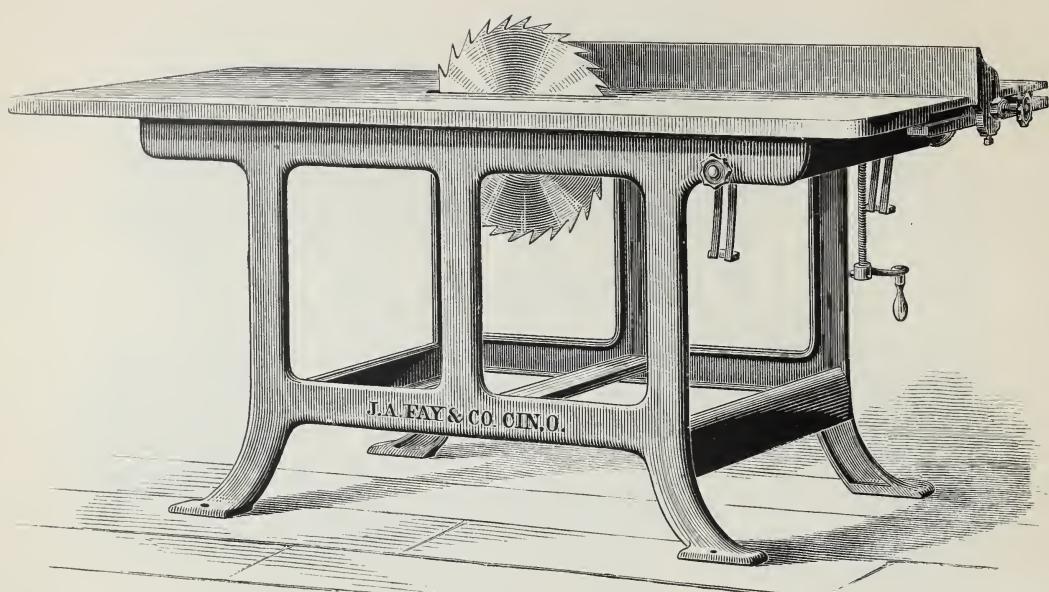
It is provided with a wrought-iron carriage similar to those used on the tenoning machines, furnished with stops and gauges for cutting stuff to a given length, either square or angular. The table is hung on hinges, and can be raised or lowered to suit different kinds of work.

It is fitted with our No. 3 patent saw arbor, running in connected self-oiling boxes, which is furnished with our patent expanding device, operated by means of a screw at the end, enabling the operator to use saws with different size holes, without the necessity of bushing them, and also provided with safety device for locking the arbor, to prevent accident while putting on or taking off the saw, by simply turning a pin lever. The arbor is suited to receive a twenty-inch saw and under. The size of the arbor between the collars to receive the saw is $1\frac{3}{16}$ inches.

The machine, when fitted with our improved grooving heads, is quite extensively used for cutting gains in window frames, doors, etc.

We can furnish a No. 1 groover head, to cut from $\frac{1}{4}$ to $\frac{5}{8}$ inches wide, or No. 2 groover head, to cut from $\frac{3}{4}$ to $1\frac{1}{2}$ inches wide, as may be wanted.

The pulley on the saw arbor is five inches in diameter and five inches face, and should make 2,500 revolutions per minute.



NO. 1 AND 2

Iron Frame Ripping Saw Tables.

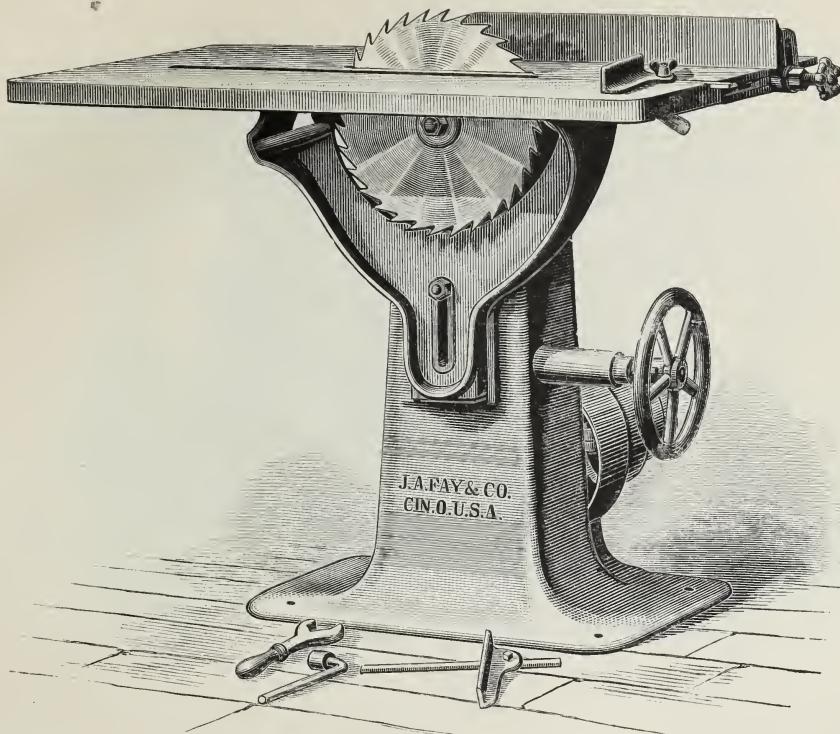
These machines are similar in design, and the frames substantial in their construction. The table for No. 1 is five feet six inches long by thirty inches wide, and for the No. 2. six feet six inches long by three feet wide, glued up of alternate strips of cherry or maple and black-walnut. The No. 1 will take in saws to sixteen inches in diameter. The No. 2 will take in saws to twenty-four inches in diameter.

The tables are hinged at one end, and have a raising screw at the other with slotted supports held by bolts and hand wheels to hold the tables at any required height. The arbor bearings are formed in the cross girt of the frame, and are provided with self-lubricating arrangement and a safety lock to prevent the spindle turning while changing saws.

The fence is arranged to form a bevel of forty-five degrees, and is attached to a graduated index slide. The arbor pulleys are outside of the tables, and can be belted in any direction. An expanding device is placed in the spindle to accommodate saws having different holes.

The arbor pulley to the No. 1 is four inches in diameter and four and one-half inch face, and should make 2,600 revolutions per minute.

The arbor pulley to the No. 2 is five inches inches in diameter and six-inch face, and should make 2,200 revolutions per minute.



Column Ripping Saw.

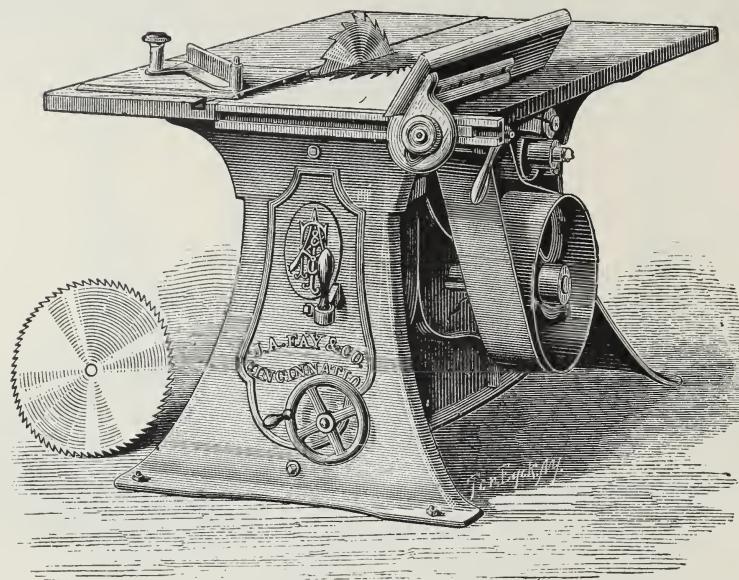
This is a machine intended for the use of cabinet makers, pattern makers, or where any light cutting or ripping is to be done. The saw arbor is fixed in bearings in the top of the column, and driven by a countershaft near the base, making it complete and easy to run direct from the line shaft.

The table is adjustable vertically by means of a screw operated by the hand wheel at the front. The table is of maple or cherry and black walnut, in alternate strips; it is hinged for lifting it, for removing or replacing the saw.

The fence is provided with a graduated index slide, and is adjustable to cut angles to forty-five degrees. There is a cutting-off slide, which is adjustable to cut mitres at any angle.

The machine will take in saws to fifteen inches in diameter. The arbor is provided with an expanding device to accommodate saws with different sized holes.

It is supplied with a countershaft, having our patent tight and loose pulleys upon it, which are eight inches in diameter and four-inch face, and should make 825 revolutions per minute.



NO. 2

Standard Rip and Cross-Cut Saw Bench.

For ripping, cross-cutting, grooving, cutting miters, bevel sawing, and many other functions for which a saw can be adapted, this machine is peculiarly fitted. The frame is constructed with two solid ends, and a ribbed plate connection, bolted solidly together.

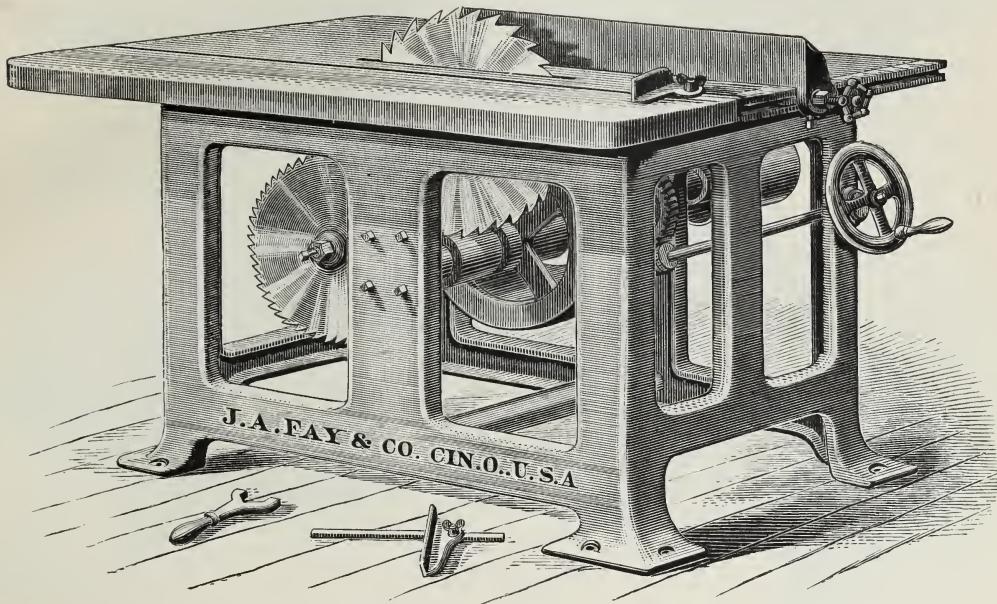
The saw arbor is swung upon an arm attached to the central plate; the bearings are cast in one piece with the arm, guided and held to its place by a bolt through a slotted hole in the central plate. The surfaces coming in contact on the central plate and arbor frame are planed true to insure the saw always being perfectly square with the table, and a handled nut on the bolt screws the arbor frame to its position when set.

The saw is raised and lowered by means of a segmental screw-gear and screw, operated by a hand wheel at the end of the machine. The tension of the belt is produced by an idler pulley on a swinging arm, and operated by a bar, the handle of which projects at the end of the machine.

The table is of iron, and furnished with our patent adjustable saw gauge, which slides upon a graduated index bar, and is arranged for sawing to a bevel or at right angles, as may be desired. The table is provided with a sliding guide or fence for cross-cutting square, or at an angle for mitering.

It is provided with a countershaft, and can be belted from any direction. The machine will receive saws to twenty inches in diameter; the arbor has an expanding device to suit different sized holes in the saws without the necessity of bushing.

The countershaft is supplied with the patent tight and loose pulleys, which are ten inches in diameter six inch face, and should make 700 revolutions.



Double Revolving Saw Table.

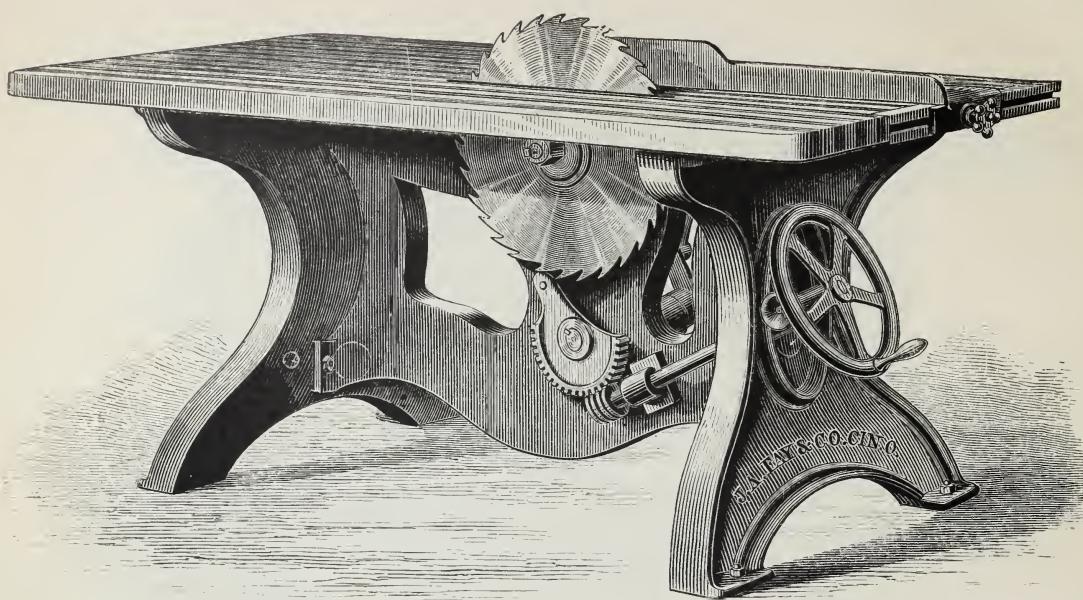
(RIP AND CROSS-CUT.)

This machine is designed for ripping or cross-cutting, and is especially adapted to the requirements of carpenters, pattern makers, cabinet makers, or any establishment where frequent changes are made in the character of the work.

The machine is arranged to use saws to fourteen inches in diameter. There are two arbors placed in a revolving frame, which, in moving around, brings either the rip or cross-cut saw into use, as may be desired. The frame is revolved by means of a hand-wheel moving a worm and gear. The saws are operated by frictions, which are regulated in their contact by the arbor frame moving against a circular guide under the table. The guide is so placed that when the saws are both below the table they do not run, but when either is made to project through the table it is in motion.

There is a fence for ripping, which can be set to saw beveling to an angle of forty-five degrees, and grooves are planed in the table to receive slides for cross-cutting. The fences on the slides can be planed at any angle for mitering and work on both sides of the saw.

The machine can be belted in any direction, and is supplied with the patent tight and loose pulleys, which are eight inches in diameter and four inch face, and should make 900 revolutions per minute.



NO. 3

Large Size Patent Ripping Saw Table.

(WITH ELEVATING MANDREL.)

This is a very heavy and substantial machine, designed for the heaviest class of work in railway, car, wagon, and agricultural shops, ship yards, etc., where a machine is needed which possesses great strength and durability.

The frame, which supports the saw and table, consists of two solid ends bolted to a heavy ribbed plate connection, upon which the saw frame is gibbed, giving it great solidity, at the same time leaving all parts easy of access.

The top is made of wood or iron, (to suit purchasers,) planed true, fixed rigidly to the frame, and is low, to allow the heavy lumber worked upon it to be easily handled.

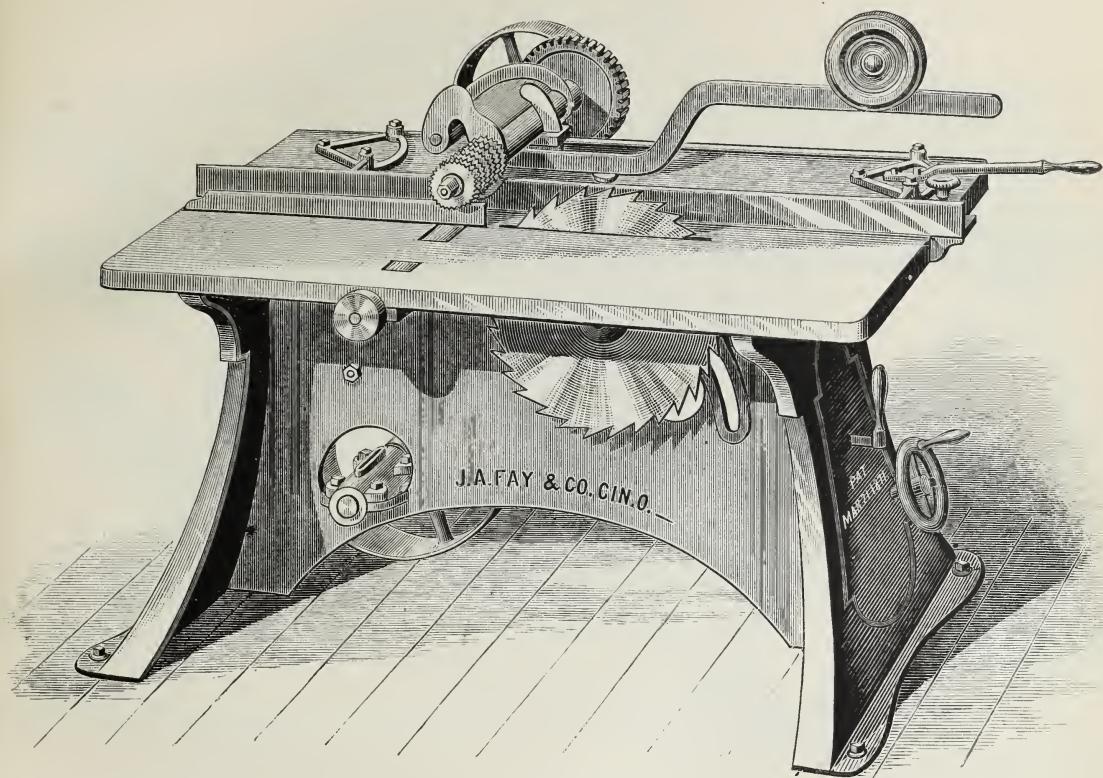
The arbor is made of best refined cast-steel, has a patent expanding device, and runs in connected patent self-oiling boxes, having arms which are fastened at the ends to the frame. It is raised and lowered by means of a segmental screw gear and screw, connected with a hand wheel, conveniently placed at the end of the machine, so that the saw may be adjusted for different thicknesses of stuff, as may be desired.

A uniform tension of the belt is maintained by a tightener pulley, which takes up all looseness of the belt wherever the saw may be placed.

It is provided with our patent adjustable saw gauge, the slide of which is graduated, for convenience of measurement, into inches and parts of an inch.

The gauge is fastened by a bolt, which moves in a slot in the end of the table, leaving the face of the table free of all slots or bolt holes. It is adjustable for sawing beveled work, and can be set to a right angle without squaring.

It has the patent tight and loose pulleys, which are twelve inches in diameter and three-inch face, and should make 450 revolutions per minute.



NO. 2
Self-Feeding Standard Saw Table.

This machine is designed for edging and ripping up lumber for the flooring machine, and also for all kinds of work usually performed on a common ripping saw table. It has the advantages of a first-class self-feed edging saw, and also a hand feed ripping saw.

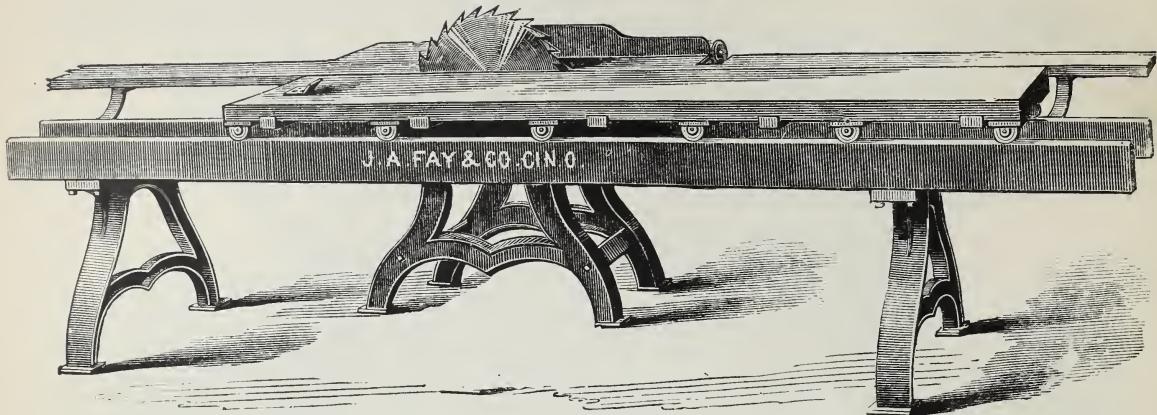
The feeding roll, which is placed back of the saw, is strongly geared, is readily adjustable for different thicknesses of lumber, and its pressure on the stuff graduated by means of a weighted lever. When desired for use as a common rip saw table, the feed roll can be instantly thrown back out of the way.

The saw arbor is hung to a movable arm which is raised and lowered by a hand wheel at the front end of the machine, enabling the operator to elevate the saw so as to just cut through the board, thus economizing the power, by a reduction of the friction on the saw, presenting a better cutting angle of the teeth, and consequently making a smoother cut, and requiring less sharpening of the teeth.

The fence or gauge is quickly adjusted for different widths without the necessity of measuring, the table being provided with a gauge spaced into inches and parts of an inch.

The machine will make a straight cut without any guide, by simply letting the feed roll take the board through as started. This feature will be appreciated when sawing boards with a crooked edge, which require straightening before other strips can be sawed from them. It will receive saws sixteen inches in diameter, is provided with planed iron table, countershaft, etc., and can be belted from any direction.

It has the patent tight and loose pulleys, which are ten inches in diameter and six-inch face, and should make 700 revolutions per minute.



Improved Carriage Edging Saw.

For planing mills or manufactories where lumber is ripped into strips, requiring straight and parallel edges, this machine is indispensable.

The machine is operated by placing the board to be edged or straightened upon the movable table and passing it by the saw.

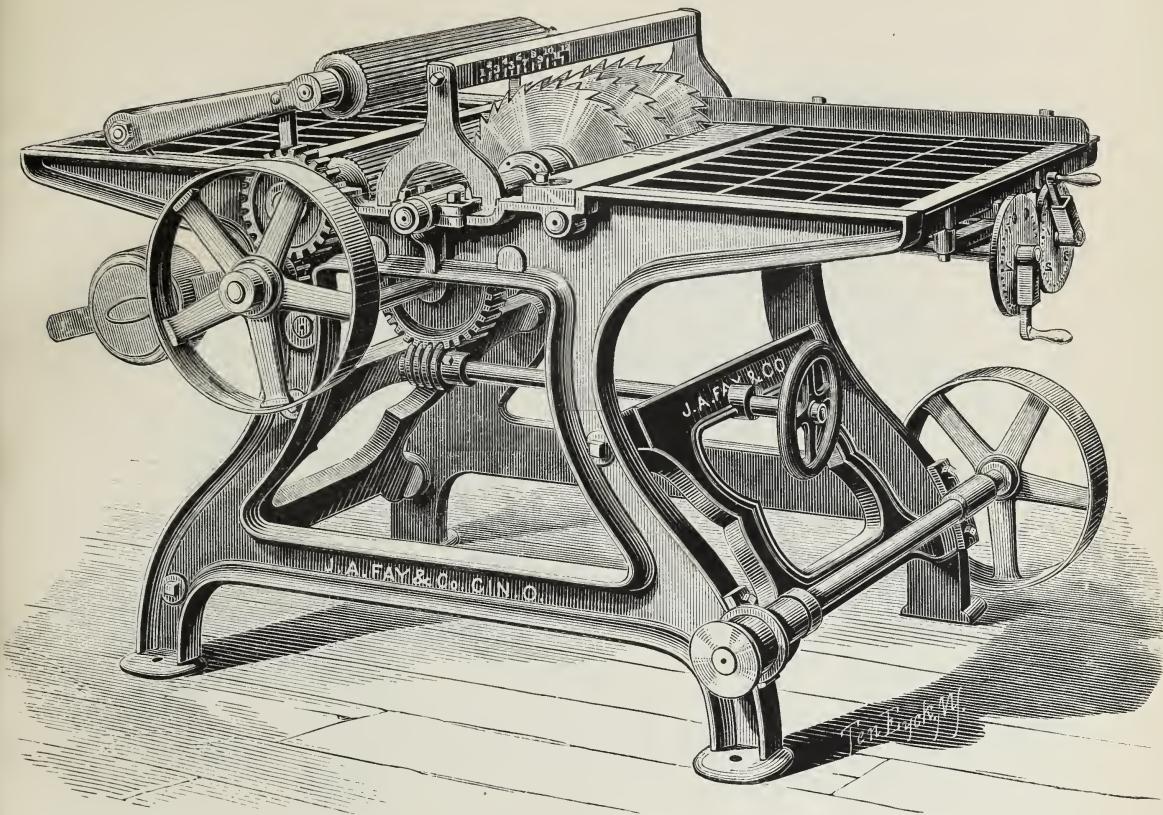
If it is desired to rip the lumber, the table can be left fixed, and the adjustable guide on the fixed table, back of the saw, set for ripping to different widths.

The frame of the machine is of iron, with planed ways. The movable table is of wood, furnished with rollers, a part of which are grooved to fit one of the planed ways on the frame, insuring a perfectly straight motion of the table.

The table running upon friction rollers, gives it a motion so easy that almost any length of table can be used with but little exertion. The usual sizes are twelve, sixteen, twenty, or twenty-four feet tables. These are made in lengths, so that, if desired, a short table can be used on a long machine.

A large size patent saw mandrel, running in patent self-oiling bearings provided with patent expanding device, operated by means of a screw at the end, enabling the operator to use saws with different sized holes, without the necessity of bushing them, is furnished with the machine, and the table is furnished with necessary stops and handles.

The pulley on the mandrel is five inches in diameter, six-inch face, and the periphery of the saw should make, for soft wood about 10,000 feet, and for hard wood, 9,000 feet, per minute.



Improved Edging Saw.

(WITH SINGLE, DOUBLE, AND TRIPLE SAWS.)

This machine is designed for the use of mills, where flooring is a specialty, or where great quantities of strips of parallel widths are needed; it may also be used for ripping off scantling from the plank. It is self-feeding, the feeding rolls are behind the saws, and arranged to carry the lumber entirely away from the saws after it is cut. It is made to use one, two, or three saws, as may be desired.

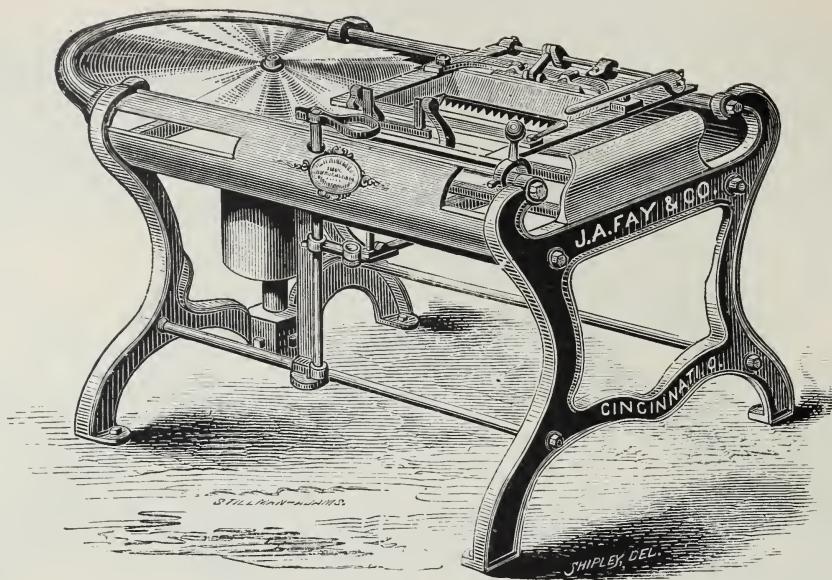
The feed is driven from the saw arbor; the upper roll is adjusted to different thicknesses by a worm gear, and worm connected to a rod and hand wheel in the front end of the machine, and will take in to four inches in thickness and twenty-six inches in width.

The guide for the lumber is fixed in its position, the saws are adjustable to saw any width of strips from two inches to eight inches, and will rip off a narrow and a wide strip at the same time, if desired.

The saws are moved on the arbor by a rack and pinion; the saw next the guide being moved, the other saw will be moved with it, they remaining at a constant distance apart; the second saw can also be separately adjusted by its own rack and pinion.

The racks and pinions are worked by a spring handle, a pin on which is inserted into a hole in a dial plate, and indicating by figures the distance from the fence, or between the saws. It will feed one hundred feet per minute.

The pulley on the saw arbor is six inches in diameter and five-inch face, and should make 2,800 revolutions per minute.



Patent Shingle Machine.

The above engraving represents the original Evarts' Patent Shingle Machine with improved taper works. It is made entirely of iron and steel, very heavy, substantially built, and not liable to get out of order. It has a self-tilting table, so the operator need use but one hand, save to move the carriage.

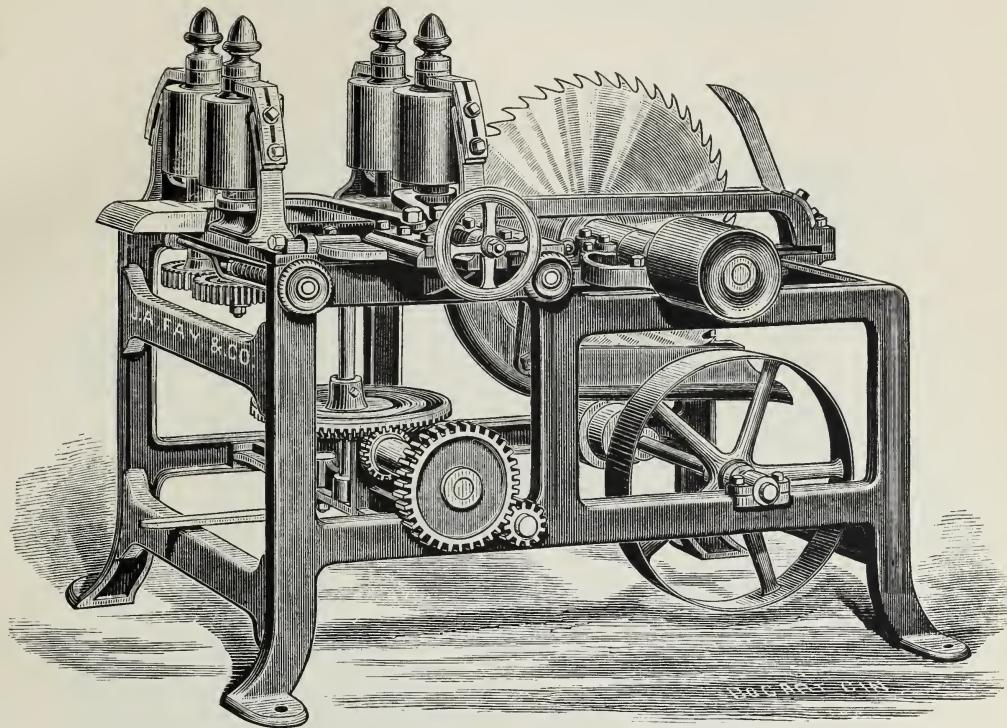
Any desired thickness of shingle can be made, both butt and top, and the taper or thickness adjusted in one minute's time. With this machine one or several shingles can be cut without change of taper; by this means the bolt can always be kept true, and the shingles all be cut with the grain of the wood. This is done without the slightest delay or extra labor of the operator.

The saw being secured to the arbor by one screw only, it can be taken off and another put on in two minutes, so no running time is lost in filing saws when more than one saw is sent with machine.

Three sizes are made. The 36-inch saw makes shingles from 16 inches to 20 inches long; the 40-inch and 42-inch saws make shingles 16 inches to 24 inches long. Heading, box stuff, etc., are made with equal facility. The 42-inch saw machine is, more properly, a heading machine. It has an advantage over other machines in its adaptation to the sawing of tight barrel heading, thick at the sap edge and thin at the heart.

The working capacity of this machine 30,000 to 40,000 shingles per day from green logs of white pine or cypress, and in yellow pine 12,000 to 15,000 per day, depending on the skill of the operator. Variations from these figures may occur from attendant circumstances, and not due to the machine.

The arbor pulley is twelve inches in diameter and six-inch face, and should make 1,100 revolutions per minute.



NO. 1
Circular Re-Sawing Machine.

(WILL SAW IN THE CENTER OR FROM THE SIDE.)

For resawing or making bevel-siding and weather boarding, the accompanying engraving represents a cheap machine which gives entire satisfaction wherever used. It is constructed in a substantial manner, and its adjustable parts are easy of access and convenient to the operator.

The lumber is fed to the saw by four rollers, which are expansively geared in pairs, so that at whatever point they may be placed, the gearing has the same effective feeding force.

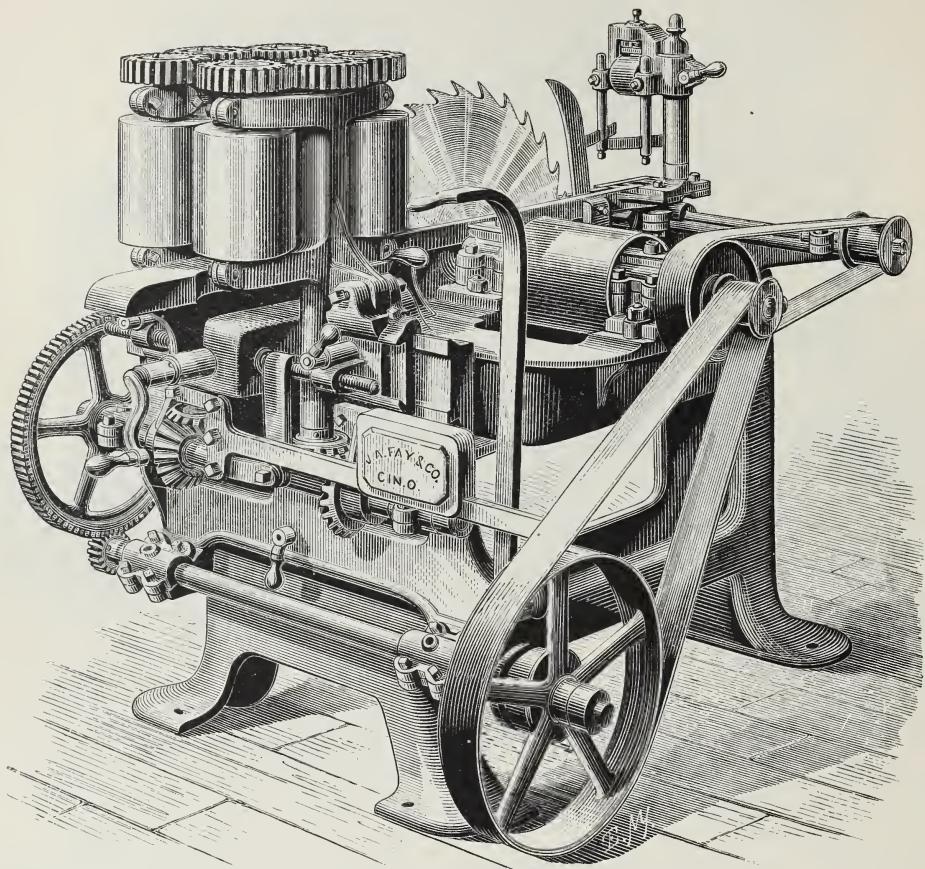
The rollers are hung upon ball and socket joints, which gives them an adjustment for bevel sawing, and presents the center of the stuff to the saw, no matter how varying the thickness. There are also adjustable springs for retaining the rollers at the proper pressure for feeding the lumber.

The saw arbor is steel, running in patent self-oiling boxes, connected and arranged to move to the rollers as the saw is worn away, and has a patent lock attachment for preventing the arbor from turning while attaching or removing the saw.

The machine will saw in the center of lumber from three-eighths of an inch to five inches in thickness, and, if desired, a thin strip can be taken from the side of the material.

There are three changes of feed speeds to accommodate for different widths of lumber being re-sawed.

The pulley on the arbor is seven inches in diameter and eight-inch face, and should make 1,500 revolutions per minute.



NO. 2.

Solid Frame Circular Re-Sawing Machine.

(WITH JOINTING ATTACHMENT AND SIMULTANEOUS ADJUSTMENT OF
ROLLS FOR BEVEL SIDING.)

NO. 2

Solid Frame Circular Re-Sawing Machine.

(WITH JOINTING ATTACHMENT AND SIMULTANEOUS ADJUSTMENT OF
FEED ROLLS FOR BEVEL SIDING.)

This machine is designed for re-sawing, or making bevel siding, weather boarding, jointing the bottom side after it is split, etc. It is very compact and occupies comparatively small space upon the floor, and it is believed to be one of the most powerful machines yet made, unexcelled for its simplicity, durability, and the rapidity of its working, and general adaptation to the requirements of planing mills, box factories, etc.

The frame is very heavy and cast in one piece, insuring strength and solidity. The working parts are all made in a thorough and substantial manner. The feed works are very powerful, and consist of four six-inch feed rolls all strongly geared and heavily weighted, mounted on a swinging frame which is so arranged as to not only self center the material, but to admit of cutting from the side when desired.

It will do any kind of re-sawing and center any thickness of material, from one-quarter to six inches, with perfect precision. By simply turning one screw, all four feed rolls can be set to any bevel required, or quickly changed for different thicknesses of lumber.

The arbor is of large diameter, runs in self-oiling boxes, which are arranged to be adjusted to the feed rolls, as the saw is reduced in size by wear, or when it is desired to use a saw of less diameter.

It has also a jointing head, placed on the extreme end of the machine, driven from the saw arbor, for jointing the bottom edges of bevel siding after it has passed the saw. It is very simple and convenient, and it is only necessary to slip off the belt when not required for use.

It is furnished with a 24-inch taper ground Disston saw, and, for perfect accuracy of sawing, is unrivalled. Some of its distinguishing features are, viz :

1st. It has four feed rolls with power applied to all.

2d. Both sets of feed rolls can be made yielding, or either side rigid for splitting even thicknesses, and have both lateral and transverse adjustments.

3d. The rolls can be opened to admit six-inch lumber.

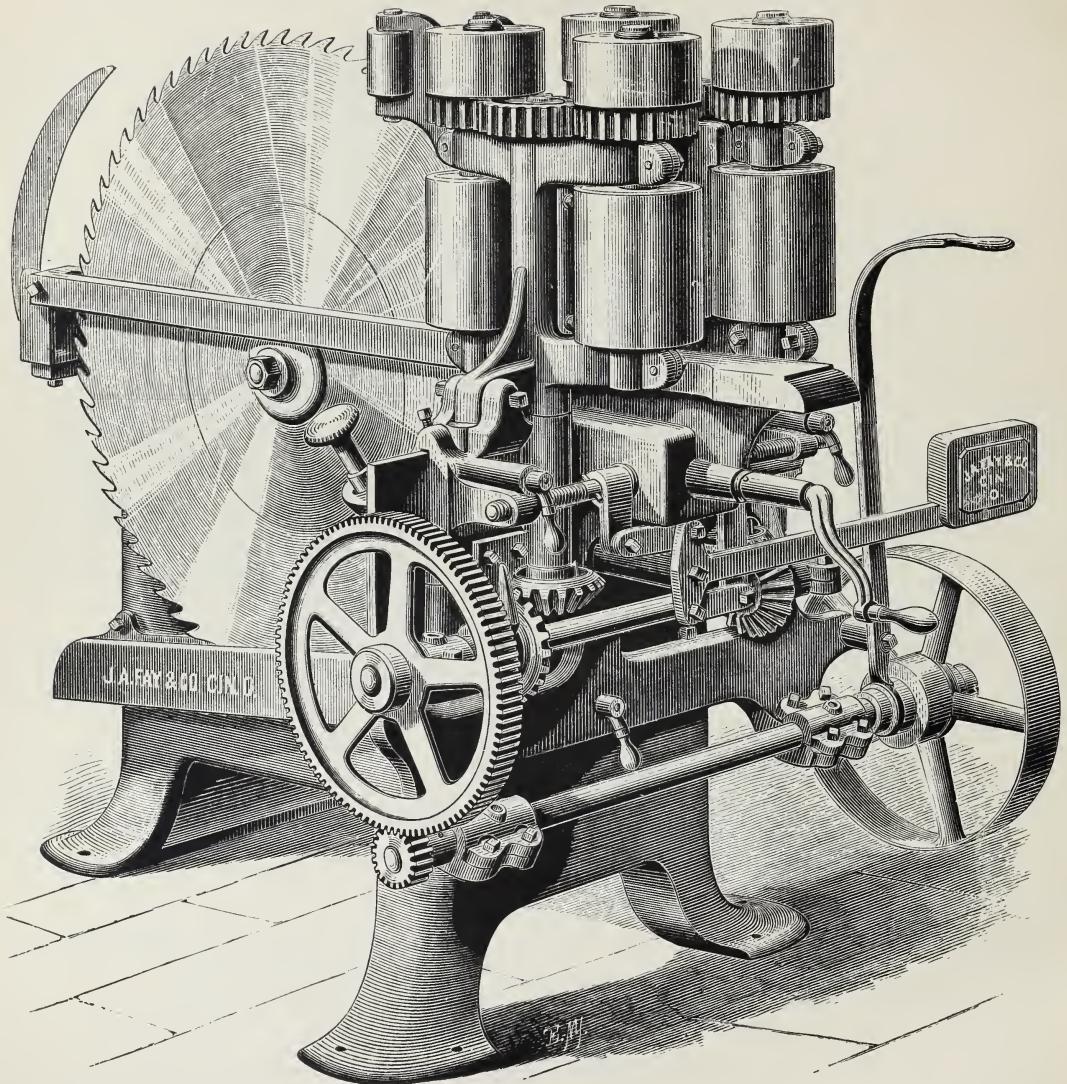
4th. The movement of a single screw adjusts the rolls laterally upon either side.

5th. The saw is arranged to run close between the rolls, and can be moved forward as it is reduced in size by wear, and can be quickly detached without removing the arbor.

6th. By a novel arrangement of the frame that sustains the feed works, they can all be inclined by one movement to varying angles.

7th. It has changes of feed, and will re-saw ninety feet per minute at its fastest speed.

The arbor pulley is ten inches in diameter and eight-inch face, and should make 1,500 revolutions per minute.



NO. 4

Large Circular Re-Sawing Machine.

WITH

WEIGHTED PRESSURE FEED ROLLS

AND TAPER GROUND FLANGES ON SAW.

N.O. 4

Large Circular Re-Sawing Machine.

WITH WEIGHTED PRESSURE FEED ROLLS AND TAPER GROUND FLANGES ON SAW.

The machine illustrated in the accompanying engraving has been designed and perfected after careful study of the requirements of a first-class circular re-sawing machine; adapted for re-sawing thin stuff, such as mirror and picture frame backing, cabinet, carriage and box work, and is regarded as one of the most powerful and complete machines made.

It is built in the most substantial and compact manner, and possesses many important improvements, as well as special features and advantages, which render it superior to any machine of the kind in use.

The frame is made in one solid casting, securing solidity and strength. The feed rolls are of large diameter and heavily geared, and are so arranged as to self-center the material, and to admit of cutting from the side when desired. It is also provided with a pair of friction rolls near the top line of the saw for steadyng and guiding wide lumber during the process of cutting, which will be found very advantageous.

Some of the most important features may be enumerated as follows:

1st. The feed rolls are of large diameter, heavily geared, and have both lateral and transverse adjustments.

2nd. The feed rolls are perfectly self-centering, or can be made rigid on one side.

3rd. It can be quickly adjusted to slab from the side of the lumber, from four to six inches in thickness, when required.

4th. The rolls can be opened almost instantly to any desired thickness.

5th. The saw is arranged to run close up between the rolls, and can be adjusted to the feed rolls, as it is reduced in size by wear.

6th. The saw is detached without disturbing the arbor.

7th. The movement of a single screw adjusts the rolls laterally upon either side.

8th. The rolls are retained in position by an ingenious arrangement of lever and weight.

9th. By the novel arrangement of the frame that sustains the feed works, and simply turning one screw, the rolls are inclined to varying angles.

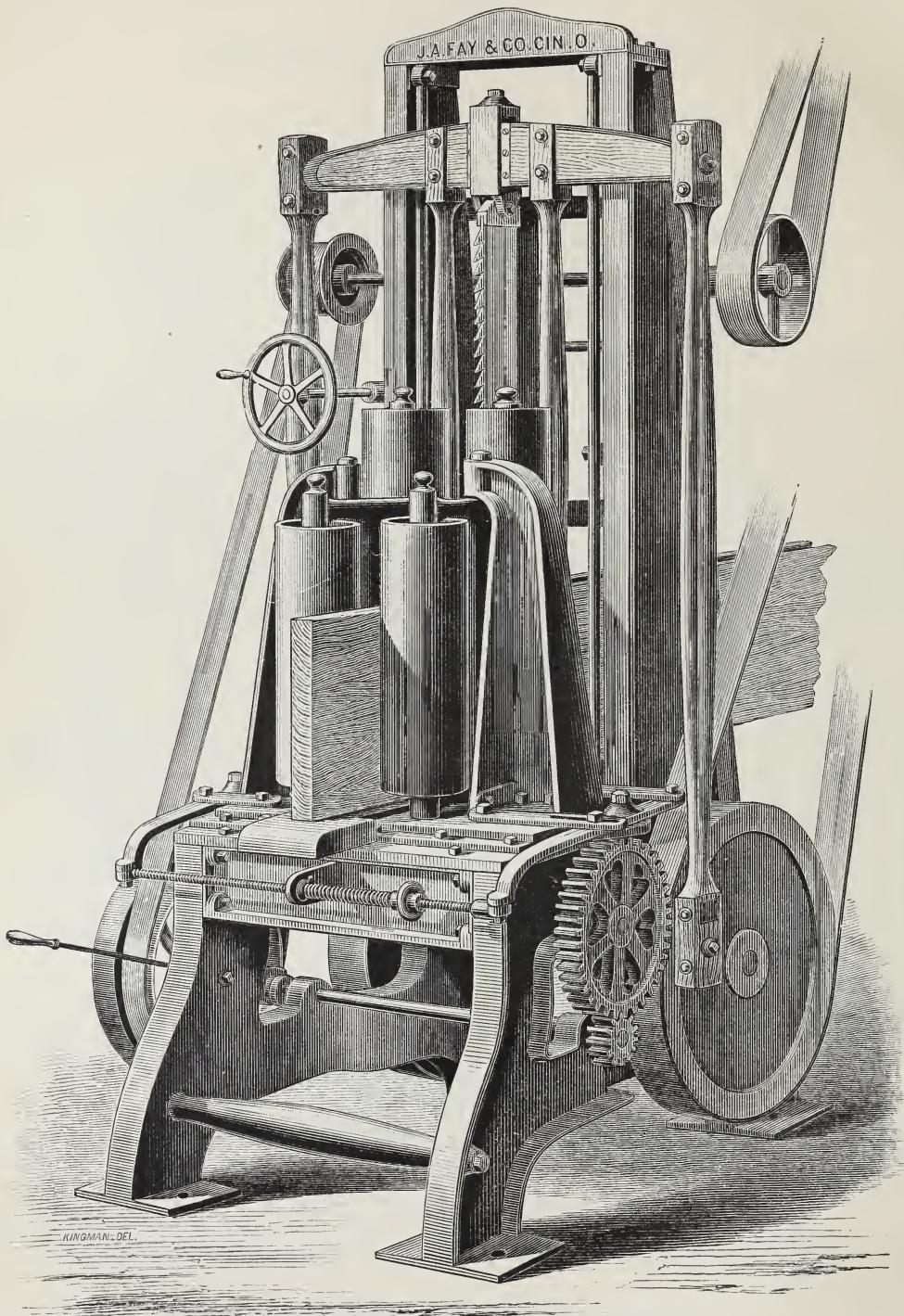
10th. The arbor is very heavy, made of the best refined cast steel, and runs in patent self-oiling journals.

11th. It is furnished with a 36-inch Disston saw fitted with taper ground flanges, securing great strength, and also admitting the use of a much thinner blade than ordinary re-sawing machines.

Perfect accuracy of sawing with this machine is assured. It is so simple that any mechanic of ordinary capacity, who has sufficient intelligence to file and keep the saw in order, can do good work.

A careful examination of its merits, we think, is sufficient to convince any one of its simplicity and effectiveness for all re-sawing purposes.

The pulley on the saw arbor is twelve inch diameter, eight-inch face, and should run about 1,000 revolutions per minute, depending upon the size of the saw used.



Portable Vertical Re-Sawing Machine.

WILL RE-SAW UP TO THIRTY INCHES WIDE AND SIX INCHES THICK.

(WITHOUT PIT.)

Portable Vertical Re-Sawing Machine.

(WILL RE-SAW UP TO THIRTY INCHES WIDE AND SIX INCHES THICK.)

This re-sawing machine is self-contained, and is adaptable for positions in which it would be inconvenient or impracticable to have an excavation made to receive a pitman below the floor.

It is driven from a countershaft overhead, the fly-wheels being used as driving pulleys on the machine. The saw frame and connections are made of wood, to have as little weight as possible in the reciprocating parts.

The feed works are driven from the countershaft, and has two changes of feed. The feeding is started and stopped by means of a lever and clutch. The feeding rollers, of which there are four, are all driven, and in their adjustment the gearing acts with them in their movement, and are driven the same at all points.

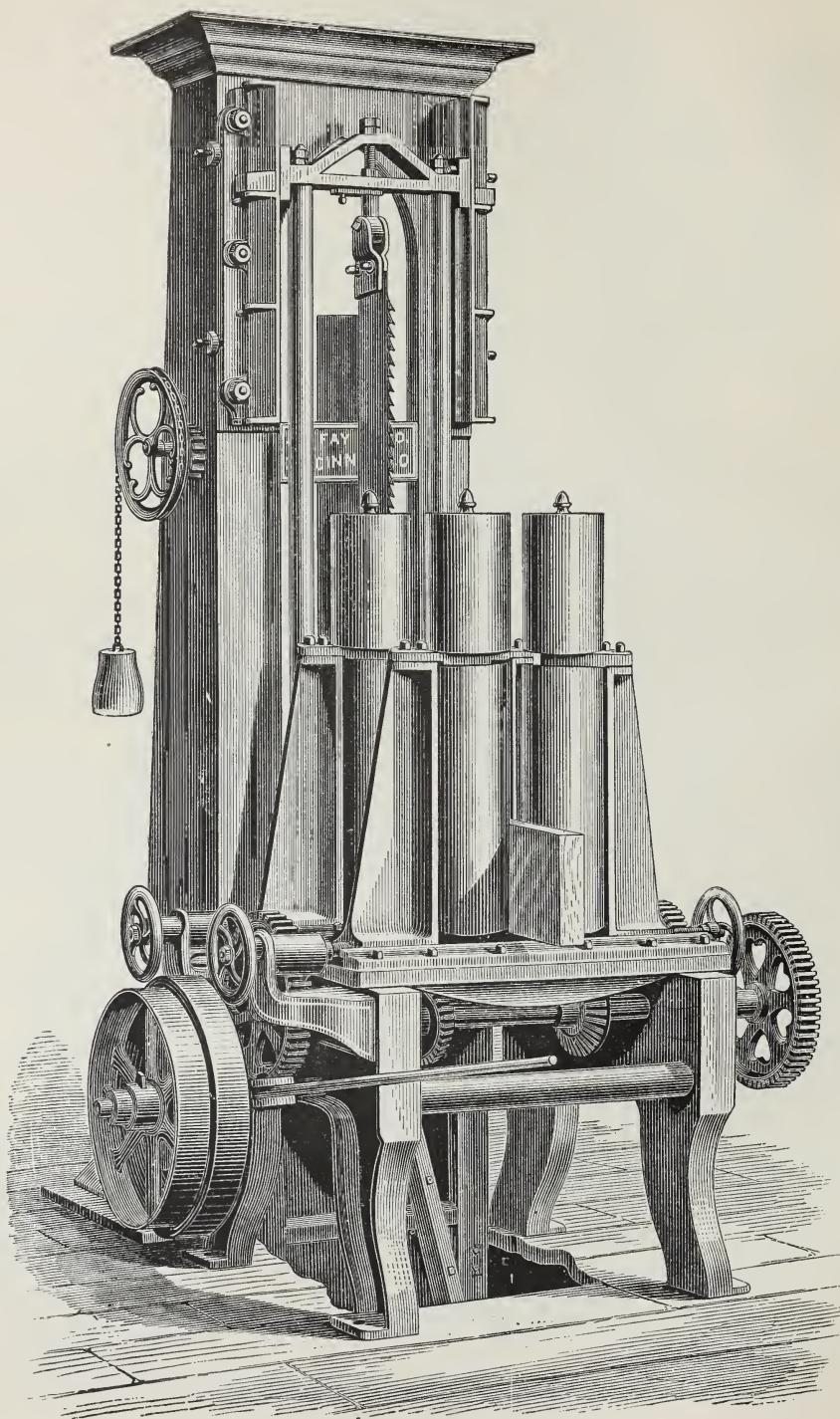
The feeding rollers are adjusted to different thicknesses of stuff by levers attached to their sliding frames, and operated by handwheel and screw. They can be adjusted to saw in the center, or one pair of rolls can be fixed as guide rollers, and any thickness sawed from the guide side.

The pressure on the feeding rollers is obtained by a spring on the screw which regulates their distance apart.

The saw is supported at the bottom of the cut by wooden side guides, and there is an adjustable weight for holding down the stuff as it is fed through.

A very thin saw can be used, making a saving in the waste from the kerf. The capacity of the machine is to thirty inches in width and to six inches in thickness.

The tight and loose pulleys are fourteen inches in diameter and eight and one-half inch face, and should make 550 revolutions per minute.



Large Vertical Re-Sawing Machine.

(WITH PITMAN BELOW FLOOR.)

Improved Vertical Re-Sawing Machine.

(WITH PITMAN BELOW FLOOR.)

This machine is exceptionally strong and heavy in all its parts, and is designed for re-sawing all kinds of wide lumber into thin boards. It is constructed entirely of iron and steel, with the exception of the pitman, in the most thorough manner, and for an effective and labor-saving machine for use in planing mills, agricultural, cabinet, and box shops, it has no superior.

It is made to re-saw up to twenty-eight and thirty inches wide and six inches thick, and owing to the very thin gauge saw used, it removes a very thin kerf.

The feed works are detachable from the main column, and are of the strongest possible kind.

All four feed rollers are driven and expansively geared in an improved manner, and the feed is graduated for wide or narrow sawing.

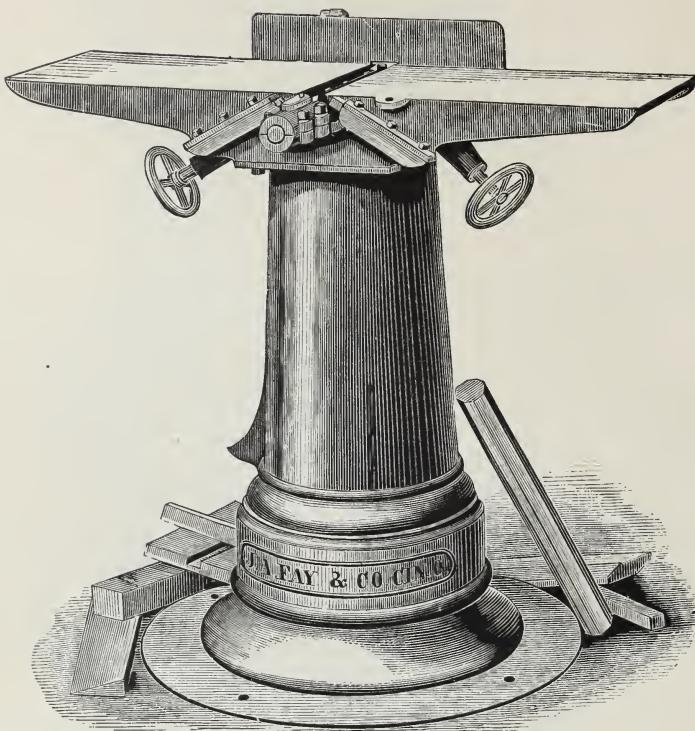
It can be changed to cut from the side of a plank or board without stopping the machine, with ease and facility.

The crank and pitman work from below; the gate in which the saw is fastened runs in planed V guides, and the saw is readily accessible for sharpening and putting it in order.

It is furnished with fly-wheel, shaft, pitman, tight and loose pulleys, one saw, and is complete in all respects, and ready for use when received and set up.

There are other improvements over the machines hitherto offered to the public which we have not enumerated, but which purchasers will readily notice and appreciate.

It is supplied with our patent tight and loose pulleys, which are twenty inches in diameter and eight-inch face, and should make 275 revolutions per minute.



Column Hand Planer and Jointer.

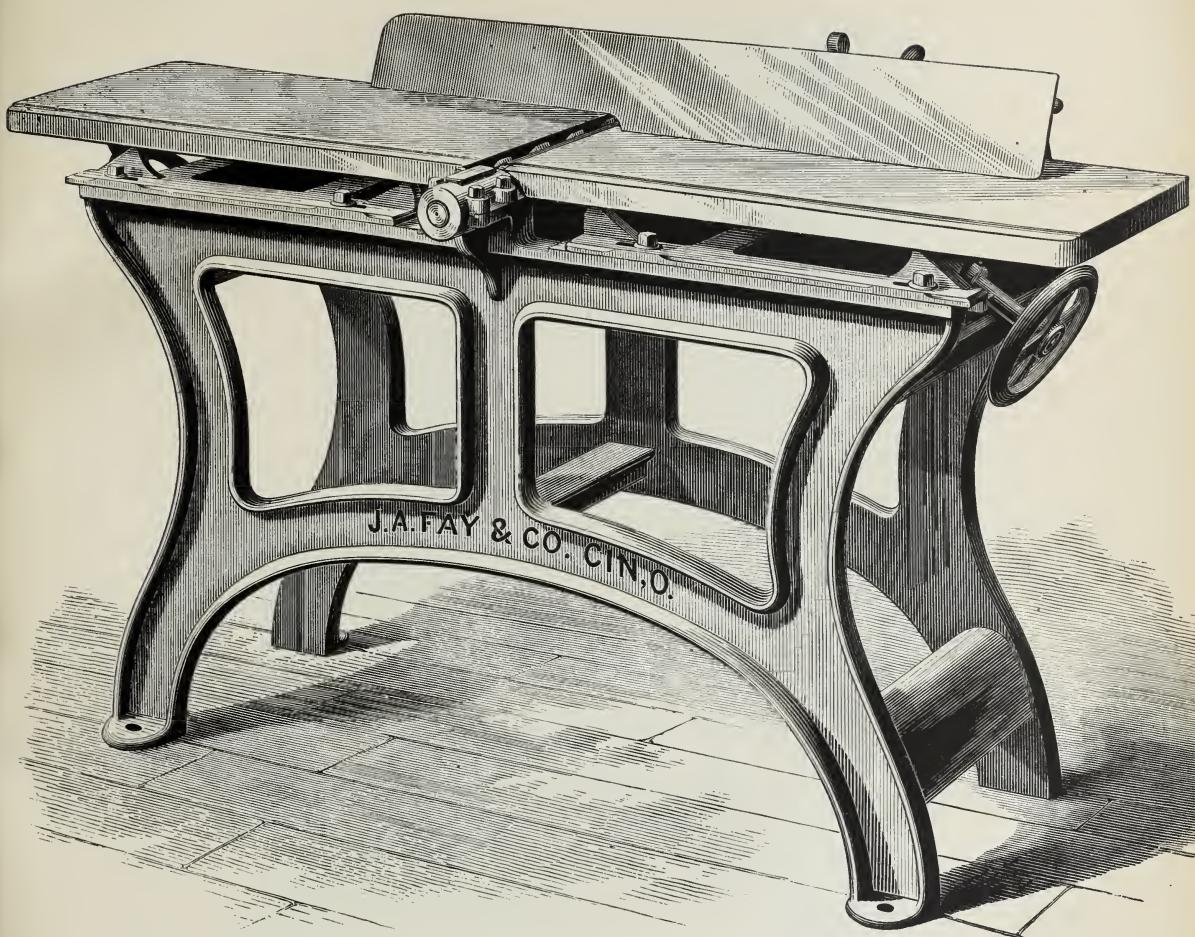
THIS is a very compact handy little machine for planing out of wind, jointing, beveling, chamfering, squaring bed posts, table legs, etc., or any other work within the capacity of the machine, which may suggest itself to the intelligent operator.

It is constructed entirely of iron and steel, in the most substantial manner. The working parts are placed upon a cylindrical column occupying but little space on the floor, with all its parts easily accessible while in operation. The cylinder is made of wrought iron, runs in self-oiling bearings, and will plane twelve inches in width. It is provided with two tables, both being adjustable on an angle, which retains the end of the table in close proximity to the cutters.

In operating, one of them is at an elevation, on the same plane with the periphery of the cutter, the other is lowered to the thickness of the cut to be taken off. The fence can be moved over the cutters or adjusted for angle cutting on cross-grained lumber, or set at an angle to the face of the table for cornering.

For cheapness and the excellence of the work performed, it is unsurpassed and will at once commend itself to those who see it in operation.

The cylinder pulley is four inches in diameter, and four-inch face, and should make 4000 revolutions per minute.



SOLID FRAME

Universal Hand Planer and Jointer.

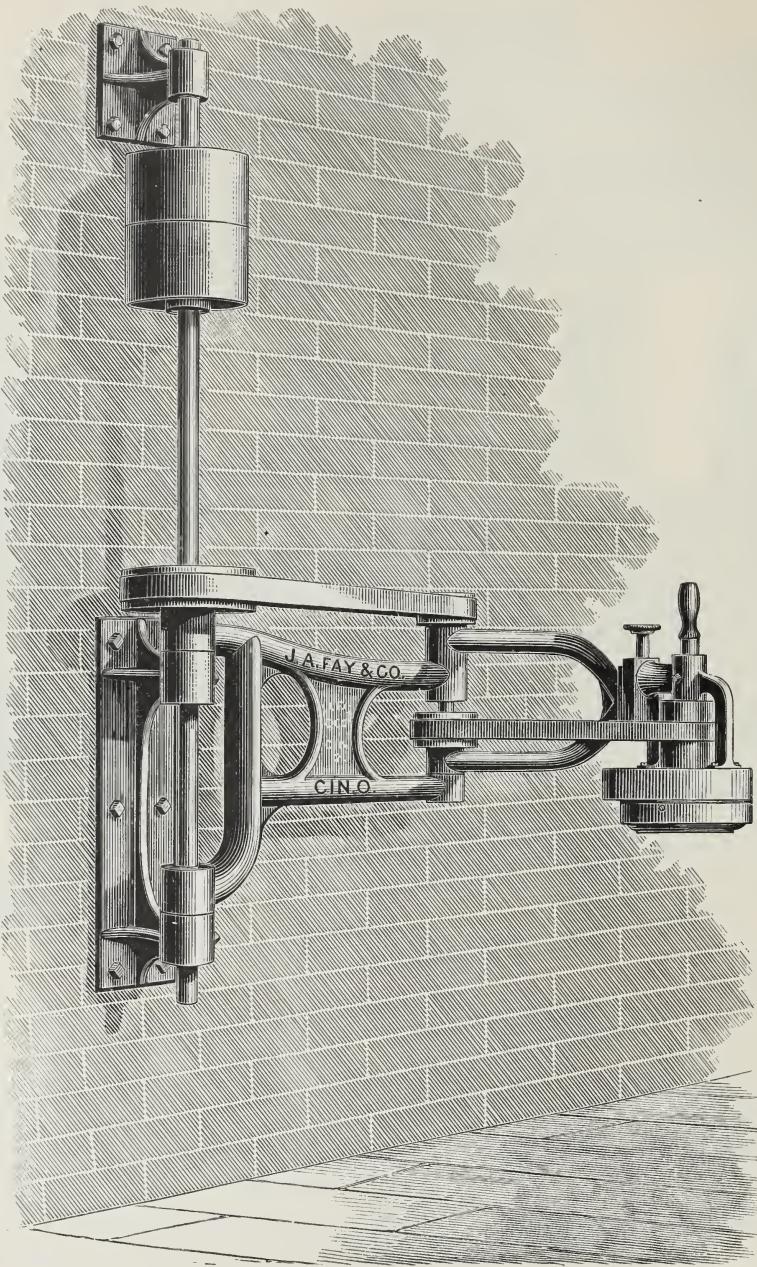
The great popularity of these machines is evidenced by the fact of their general introduction into the best wood-working shops. They are remarkably simple and compact, effective in operation, and are warranted to give satisfaction wherever used.

They are made of five different sizes, viz.: to work either 8, 12, 16, 20, or 24 inches wide, and will dress either straight or out of wind, corner, chamfer, bevel, make perfect glue joints, etc., and in their adaptation to all the general requirements in sash and door, furniture, agricultural, coffin and other manufactories have no equal.

The frame is heavy and substantial, being cast in one piece, giving it great strength and solidity. The cylinder is made of best refined wrought-iron and runs in long self-oiling bearings, filled with the very best lining metal.

The tables are made of good length, perfectly true, and are adjustable vertically and laterally to and from the path of the cutter to suit the thickness of the cut, and also to close up the gap between them, enabling the operator to produce most accurate and beautiful work.

The table frames are provided with an independent lateral adjustment, so that cutters working in a larger circle than the ordinary knives can be used. The adjustable fence and bevel rest is so arranged that it can be used laterally across the face of the table, to accommodate the wear of the cutters. A countershaft, hangers, and pulleys furnished, at an extra charge, when wanted. The pulley on the cylinder is four inches in diameter, four-inch face, and should make 4000 revolutions per minute.

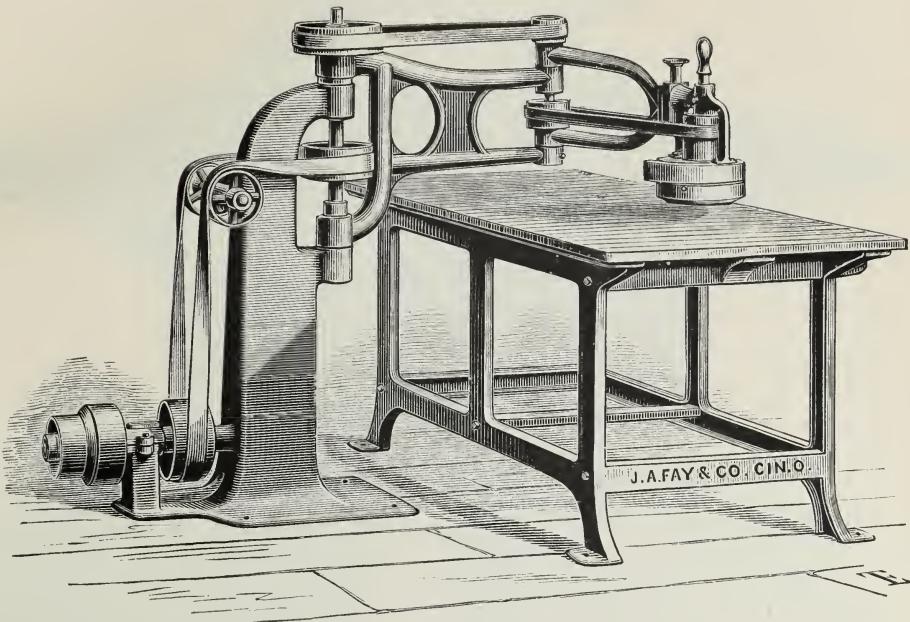


Bracket Sand-Papering Machine.

This sand-papering machine can be hung to the wall or to a post, as may be desired. It is adapted to all kinds of surface sand-papering, particularly for doors, sash, blinds, etc.; also, for cabinet, car and agricultural shops, or work of a similar character.

The driving shaft is placed vertically with the tight and loose pulleys at the top, or it may be run through the floor and belted from below. The flexible frame is hung on the countershaft, and is movable in all directions. The table is built to suit the height the machine is set. The revolving sand-paper disk is adjustable to different thicknesses of lumber, and has a spring handle to regulate the pressure on the surface. An exhaust fan is attached to the disk, and carries away the dust from the operator.

The tight and loose pulleys are eight inches in diameter and four inch face, and should make 600 revolutions per minute.



Door Sand-Papering Machine.

(WITH ADJUSTABLE DISK, FLEXIBLE ARMS, EXHAUST FAN, ETC.)

This machine can be used to great advantage in carpenter shops for finishing doors, blinds, sash, etc., and in car, cabinet, piano, or other manufactories where there are large surfaces to be finished.

Its construction, with a number of elbow joints, makes it flexible in any direction, and it is, therefore, thoroughly fitted for finishing large frames or surfaces of large area.

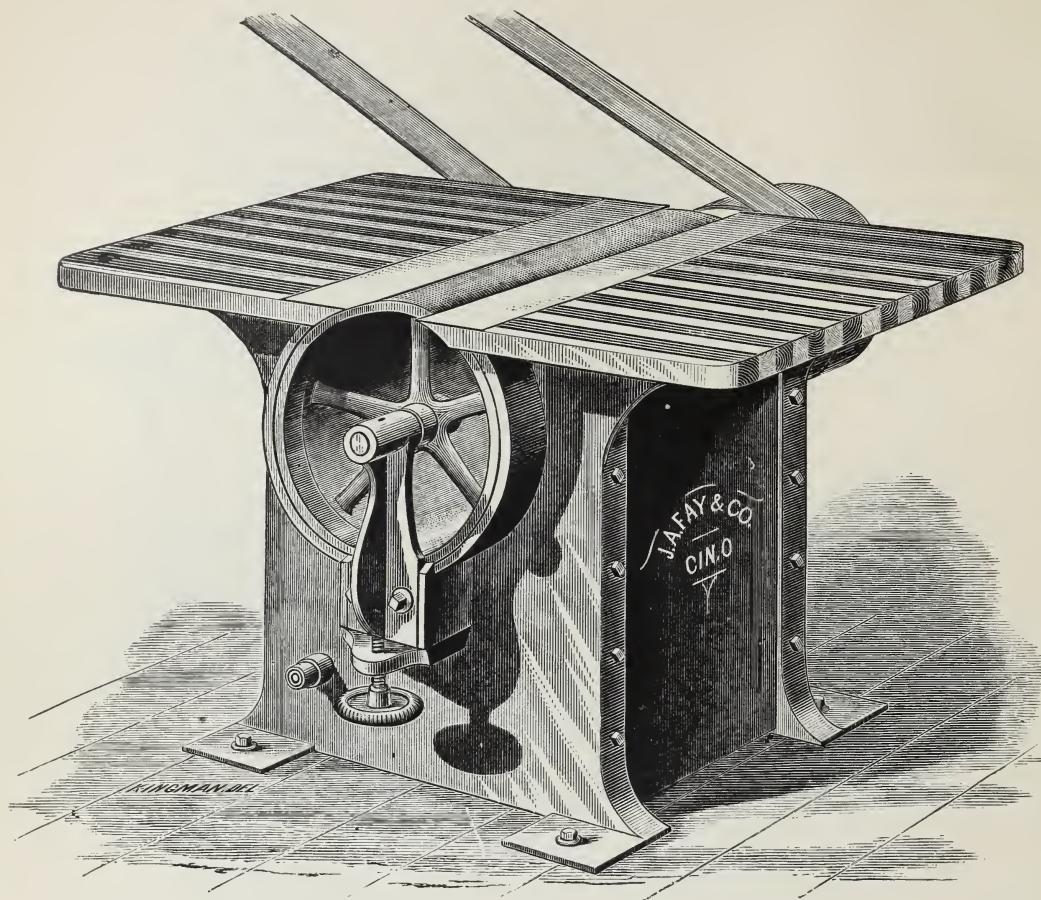
The work is performed by a disk of sand-paper, which is attached to a head-block, and revolved at a suitable speed, and moved by the operator in any direction, producing a perfectly flat and smooth surface without tearing or breaking the corners.

The flexible arms are attached to a column, which can be placed in any desired position in a factory, the tight and loose pulleys being arranged to receive the belt directly from the line-shaft.

The table accompanying the machine has a fixed top. The adjustment for different thicknesses of work is obtained by the movable end of the arm being raised or lowered by the hand-wheel and screw.

An exhaust fan is operated by the revolution of the head-block, which removes all dust from the surface of the work, and keeps it clean for the inspection of the operator.

It is furnished with the patent tight and loose pulleys on the countershaft, which are eight inches in diameter by four inches face, and should make 600 revolutions per minute.



Improved Drum Sand-Papering Machine.

This machine is intended for producing a smooth, even surface, free from marks and scratches, upon hard wood lumber, and which will admit of varnishing without raising the fiber of the wood.

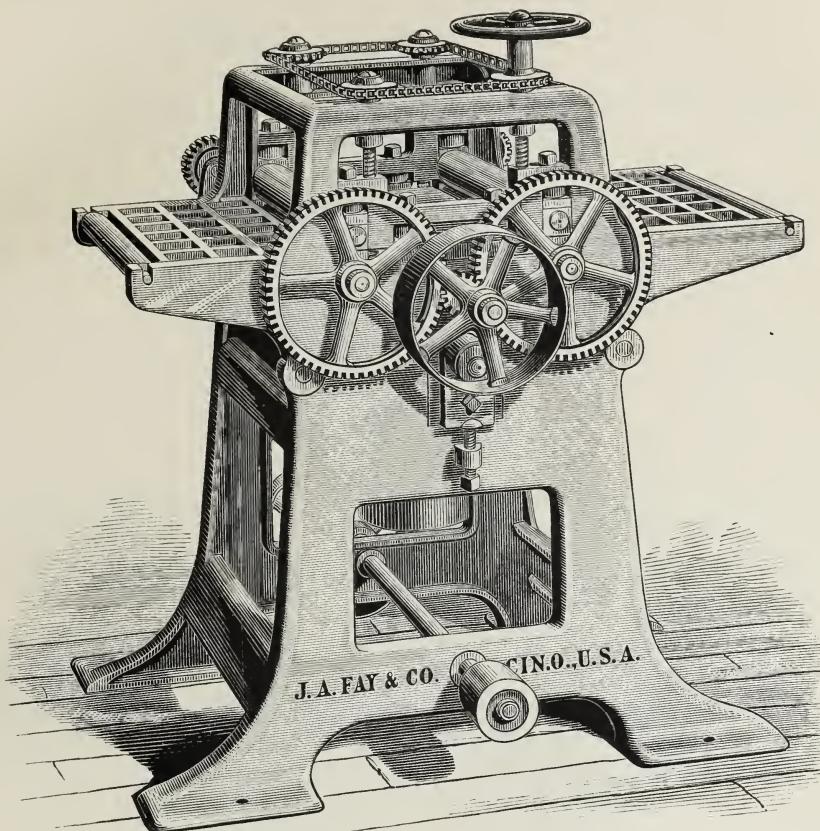
It is unsurpassed in its adaptations to the wants of all classes of manufacturers having straight and light articles on which a straight and smooth surface is desired.

For furniture, coffin, and piano manufacturers, and car and agriculture implement makers, it will be found exceedingly valuable and useful. It will produce a more even surface, than can possibly be obtained by the ordinary hand process.

The machine has a very heavy substantial iron frame of box form almost air-tight, inside of which is placed the cylinder provided with a flexible covering, carrying the sand-paper.

The table or platen is of good length, made in two sections, the ends provided with steel points and arranged to adjust the cylinder which has a vertical adjustment to regulate the amount of surface to be removed. There is also an exhaust fan which carries away all the dust, leaving the work perfect and clean, at the same time relieving the operator from the annoyance of sand and dust, so common with other machines.

The tight and loose pulleys are twelve inches in diameter, four-inch face, and should make 350 revolutions per minute.



Power Feed Sand-Papering Machine.

THIS is a continuous feed machine, being arranged with feeding rollers all of which are driven. It is designed for flat surfaces which can be fed in as in a planing machine, and is adapted for the use of coffin makers, cabinet and piano manufacturers, or any work having even thickness, .

The table of the machine is swung on hinges and can be removed easily with the feeding rollers, which are attached to it, for getting to the cylinder, for replacing the paper. The cylinder is adjustable for more or less cut on the stuff, by set screws under the bearings. The upper rollers are adjustable to different thickness of stuff by a hand wheel which operates the four raising screws at once.

The cylinder has a flexible covering over which the paper is placed. The cylinder is inclosed in a covering with a pipe to be attached to an exhaust fan to carry off the dust.

The capacity is two and a half inches thick, and twenty-four inches wide.

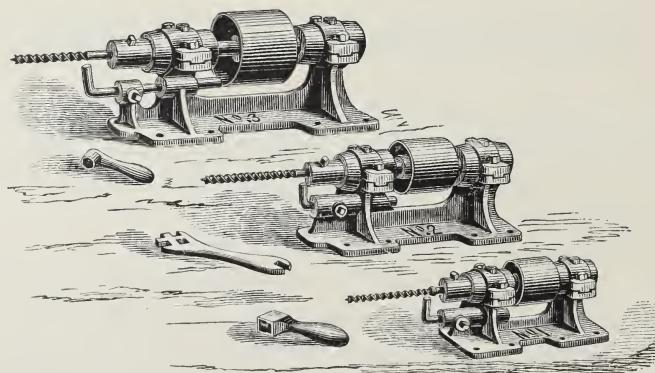
The tight and loose pulleys are twelve inches in diameter, and four-inch face, and should make 800 revolutions per minute.



Mitering Machine.

This machine is designed for cutting moldings of all kinds to a miter for picture frames, or mitering for panel moldings in doors or work of a similar character. It is quickly operated, and the work produced is finished at one operation. The machine is constructed on a substantial iron table supporting a frame in which there are two vertical rods, and is moved down and up by a hand lever.

The knives are placed at right angles to each other. Their cutting edges have an angle to the face of the table, forming a shelving cut, and making perfectly smooth work. There is a fence to hold the molding in position while being cut. The fence can be made adjustable, if desired, for varying the angles.

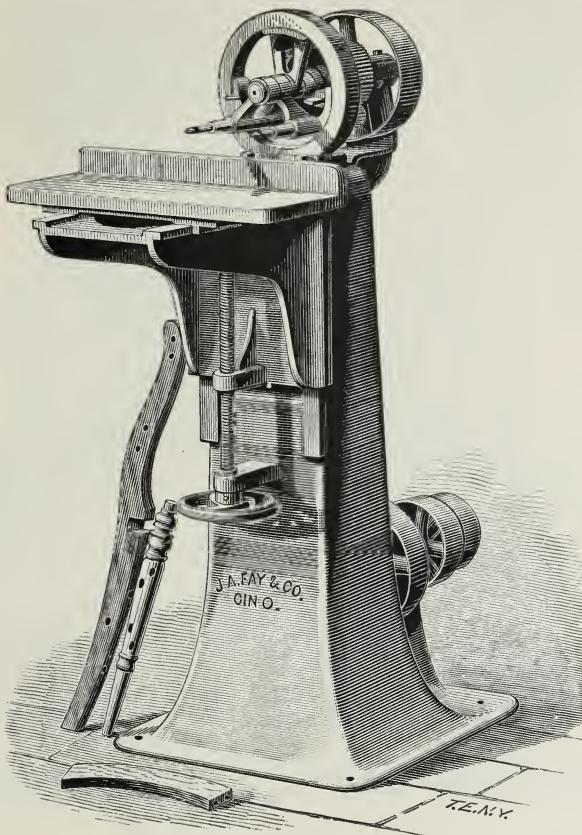


Small Boring Machines.

The above engraving represents our small boring arbors. They are very popular and convenient little machines for all classes of light boring, especially where parties have but a small amount of work to do, and do not care to incur the expense of one of the large size machines.

They are made with cast steel arbors and hard metal boxes, with pulley between, and are provided with stops to gauge the depth of the hole.

We make three sizes: No. 1, which has pulley, ($2\frac{1}{4} \times 2\frac{1}{4}$), should make 2,000 revolutions; No. 2, with pulley, ($2\frac{3}{4} \times 4$), should make 1,600 revolutions; No. 3, with pulley, ($4 \times 4\frac{1}{2}$), should make 1,400 revolutions.



Radial Chair Boring Machine.

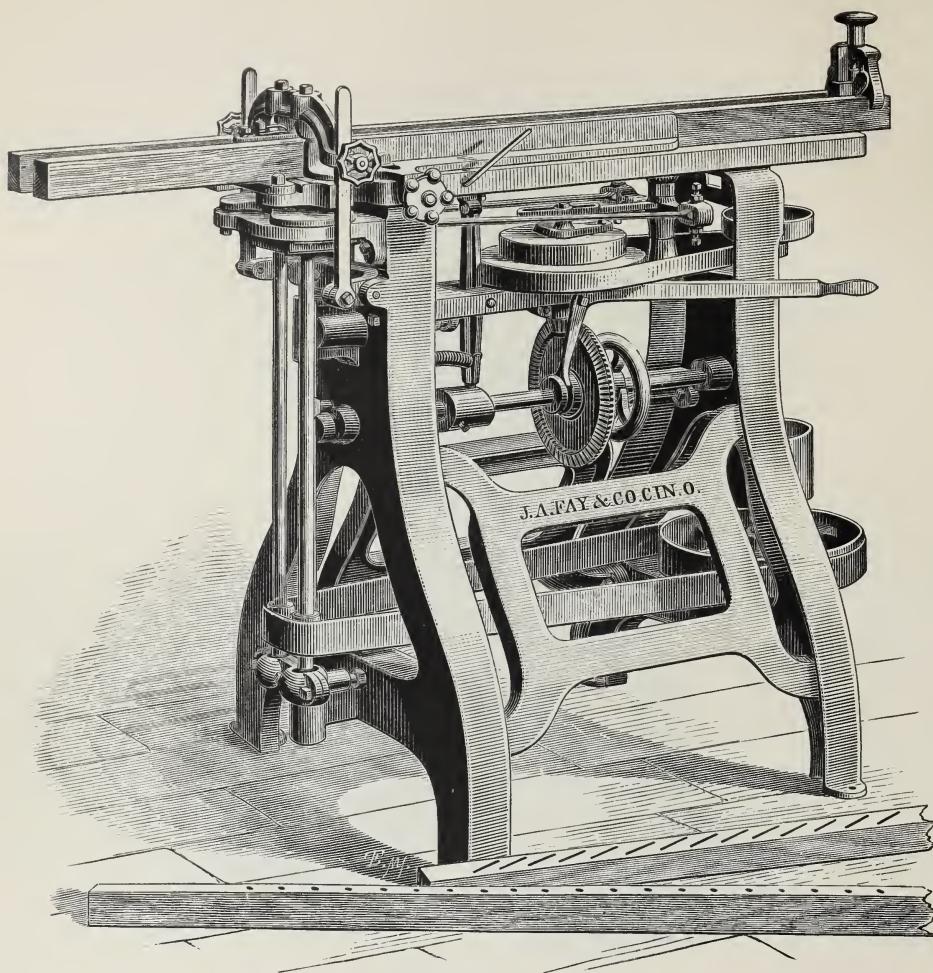
This machine is intended for boring dowel holes in chair seat frames, or where holes are to be made at regular distances apart, and will bore two holes at one operation.

The arbors are swung radially from a center attached to the circular frame, and can be moved to any part in its circumference, and the holes can be bored from seven-eighths of an inch to six inches apart, and at any angle desired.

The table is adjustable vertically by a screw and hand wheel, and slides to and from the bits on its support. There is a stop to regulate the depth of the holes, and any gauges for special work can be fastened to the sliding table.

There is attached to the column of the machine a countershaft with tight and loose pulleys, making the machine complete and in condition for work, and can be run directly from the line shaft.

The tight and loose pulleys are five and one-half inches in diameter, two-inch face, and should make 450 revolutions per minute.



Patent Automatic Blind Stile Borer and Mortiser.

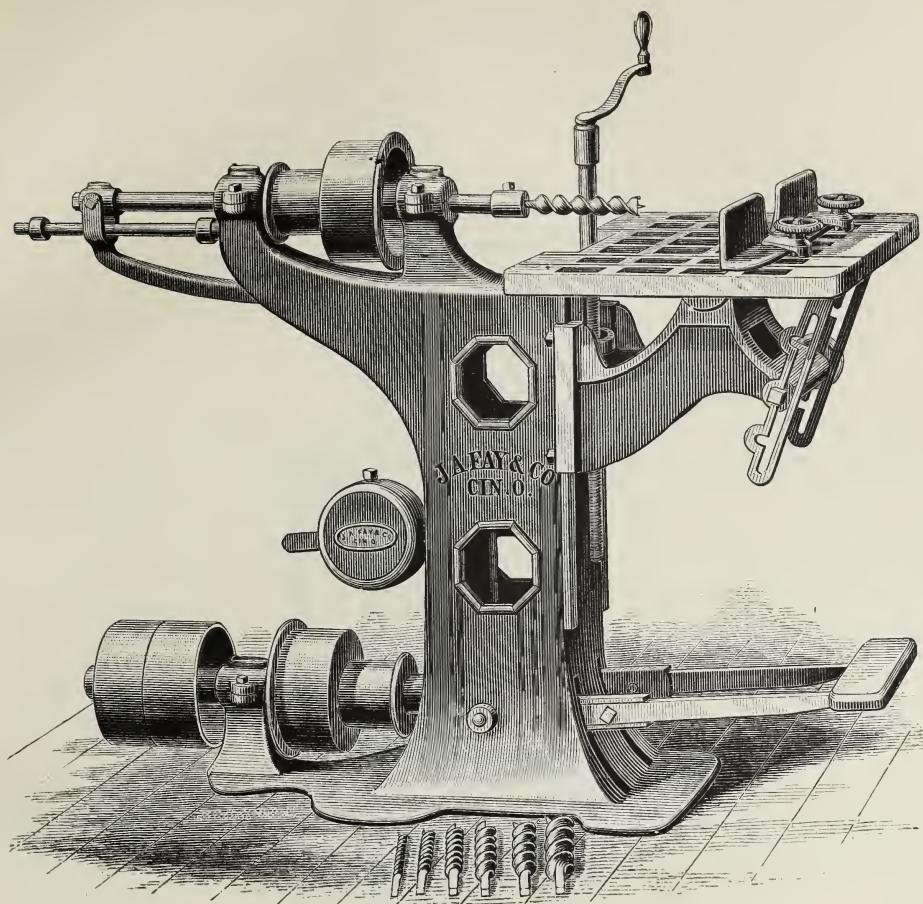
This machine is designed for boring holes for rolling blinds, and making the mortise for stationary slats, in inside or outside blinds, for doors and windows. It occupies but a small floor space, is perfectly automatic in its operation, the operator having only to put in the stiles and start the machine, and will perform the work in the most rapid and perfect manner.

The stiles are bored or mortised in pairs, the boring spindles acting by means of a cam, and when the holes are bored or the mortise completed they drop to their original position ready for the next. It will bore 150 holes or make 60 mortises per minute for stationary slats, and is capable of making any style of mortise and of any length from $\frac{1}{4}$ to $2\frac{1}{4}$ inches, and of any width, depth, or angle desired. The depth is easily regulated by a vertical adjustment of the spindles. The distance between the holes or mortises is governed by the rack, to which the spindles are attached.

The stiles are held rigidly while being worked, and, by a combination in the feeding mechanism, are released as they are fed forward, and again clamped tightly as before. Being worked from the bottom side, the work is left thoroughly clear from chips.

The cutters for boring and mortising are simple and cheap, not liable to break, cost but a few cents, and can be made by most any workman. Full instructions for operating accompany each machine.

The tight and loose pulleys on the countershaft are six inches in diameter three-inch face, and should make 500 revolutions per minute.



Universal Horizontal Boring Machine.

(WITH QUICK RETURN SPINDLE, AND RADIAL ADJUSTING TABLE.)

This machine is cast with cored section, making it very substantial. It combines all the requirements of a first-class machine for either straight or angular boring. The different adjustments can be made with great rapidity, and the machine is universal in its adaptability for horizontal and radial boring in agricultural implement, wagon, furniture, and chair shops, etc.

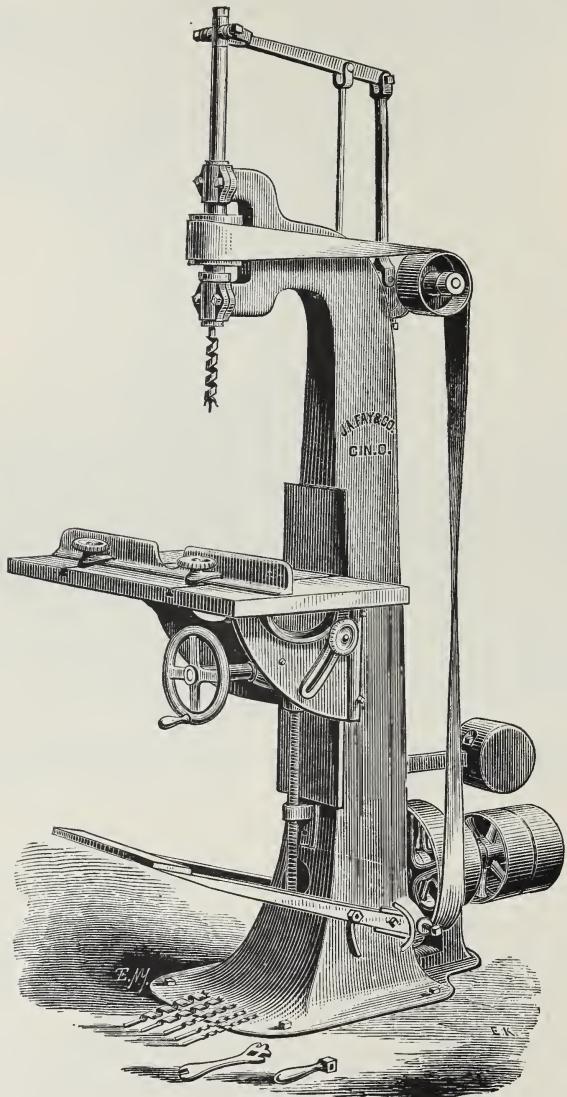
The table is gibbed to slides cast on the column, is adjustable vertically to accommodate different thicknesses of stuff, by means of a single screw, and has a radial adjustment for boring at any desired upward or downward angle. The fence moves in planed slides, is adjustable for different widths, and for boring at any desired angle.

The traversing steel spindle is operated by means of a powerful jointed treadle, fitted with an improved step, which is provided with a steel point, forming a bearing for the end of the spindle, thus greatly reducing the wear caused by the spindle pressing against the shoulder, as in the case with most boring machines. It is fitted with cone pulley, for changes of speed, and adjusting collars to graduate the depth of the hole to be bored. When required for boring large holes in hard wood, a screw rod can be attached for traversing the spindle by hand; also, side fences for end boring.

The treadle has a weighted counter-balance, giving a quick return to the spindle.

The machine is provided with countershaft, is complete in itself, easy to operate and keep in order. Full set of wrenches and five auger bits accompany each machine.

It has the patent tight and loose pulleys, which are eight inches in diameter and three-inch face, and should make 1,000 revolutions per minute.



SINGLE SPINDLE
Vertical Universal Boring Machine.

(WITH COUNTERSHAFT ATTACHED.)

SINGLE SPINDLE

Vertical Universal Boring Machine.

(WITH COUNTERSHAFT ATTACHED.)

This machine is designed and intended for use in chair, furniture, agricultural, and wagon shops, and will be found well adapted for straight boring, also, when required, for boring at an angle with the face, or diagonally through the stuff.

The column is substantial and of neat construction, the machine is strong and durable in every part, and is self-contained and ready to operate without any attachments but to the floor, and will be found very superior in all respects for the purposes designed.

The table is gibbed to planed ways, cast upon the column, and raised and lowered by a screw, the actuating hand wheel of which is under the table, within easy reach of the operator.

The table has an angle adjustment to thirty degrees, and the fence is adjusted by sliding the holding bolts in slots in the face of the table. When in operation the table is fixed in its position.

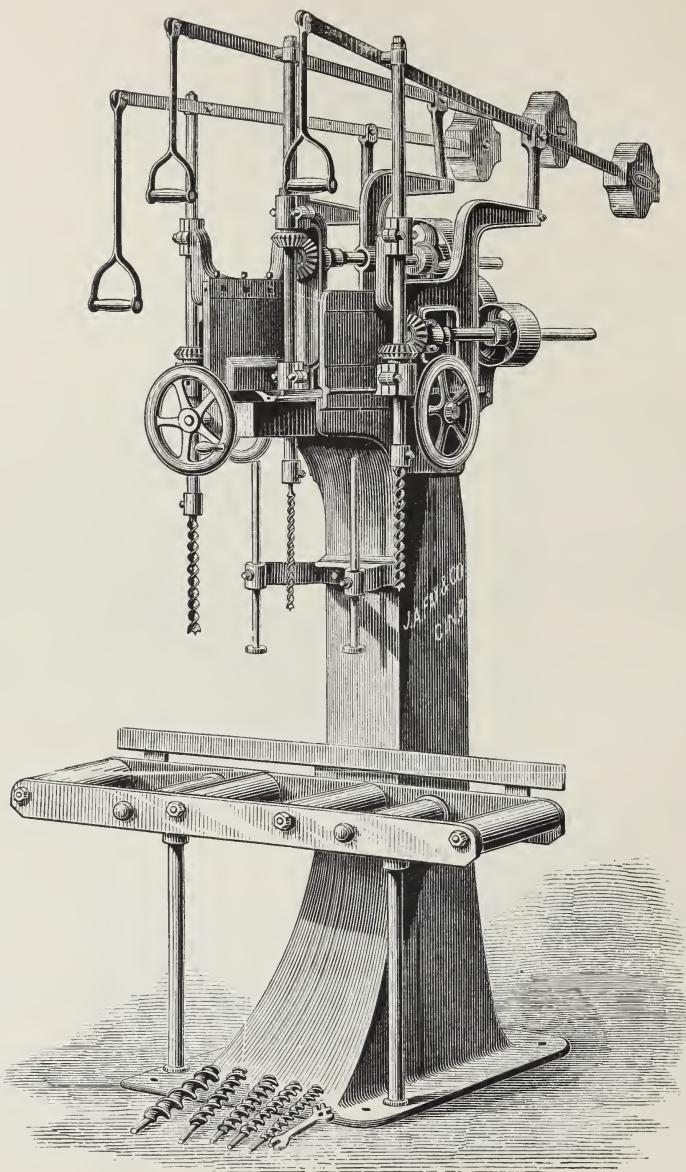
The boring spindle is brought down to the work by a treadle, worked by the foot, and is returned from the work by the counter-weighted lever connected to the top.

The spindle has a movement of eleven inches, and the depth of boring is gauged by a stop rod in the column, held in its place by a set screw.

The countershaft is attached to the base of the column, with the tight and loose pulleys in a position to receive the belt from any direction.

The boring spindle is at right angles to the countershaft, and receives the belt over two idler pulleys, making the machine self-contained and ready to operate, without any attachments but to the floor.

It is supplied with the patent tight and loose pulleys, which are eight inches in diameter three inch face, and should make 750 revolutions.



Three Spindle Vertical Car Boring Machine.

WITH COUNTERBALANCED LATERAL AND VERTICAL ADJUSTING SPINDLES, ETC.

(WILL BORE HOLES UP TO TWO AND ONE-HALF INCH DIAMETER.)

THREE SPINDLE

Vertical Car Boring Machine

WITH WROUGHT IRON TABLES,

COUNTERBALANCED LATERAL AND VERTICAL ADJUSTING SPINDLES, ETC.

THIS is a heavy machine, made suitable for railway, car, or heavy agricultural work, and will bore holes up to $2\frac{1}{2}$ inches in diameter.

Its advantages are, the avoidance of changing augers so frequently, as in the single spindle machines, the convenience of all its parts to the operator, and the rapidity and ease of adjustment.

It is arranged for three augers, of different sizes, and is capable of boring holes two and a half inches in diameter.

The spindles with their mountings are placed on a heavy column, to which the table is attached, making the machine complete in itself, requiring no attachments to the building, but to belt from the countershaft, which is vertically above the center of the machine, leaving the floor clear of all obstructions.

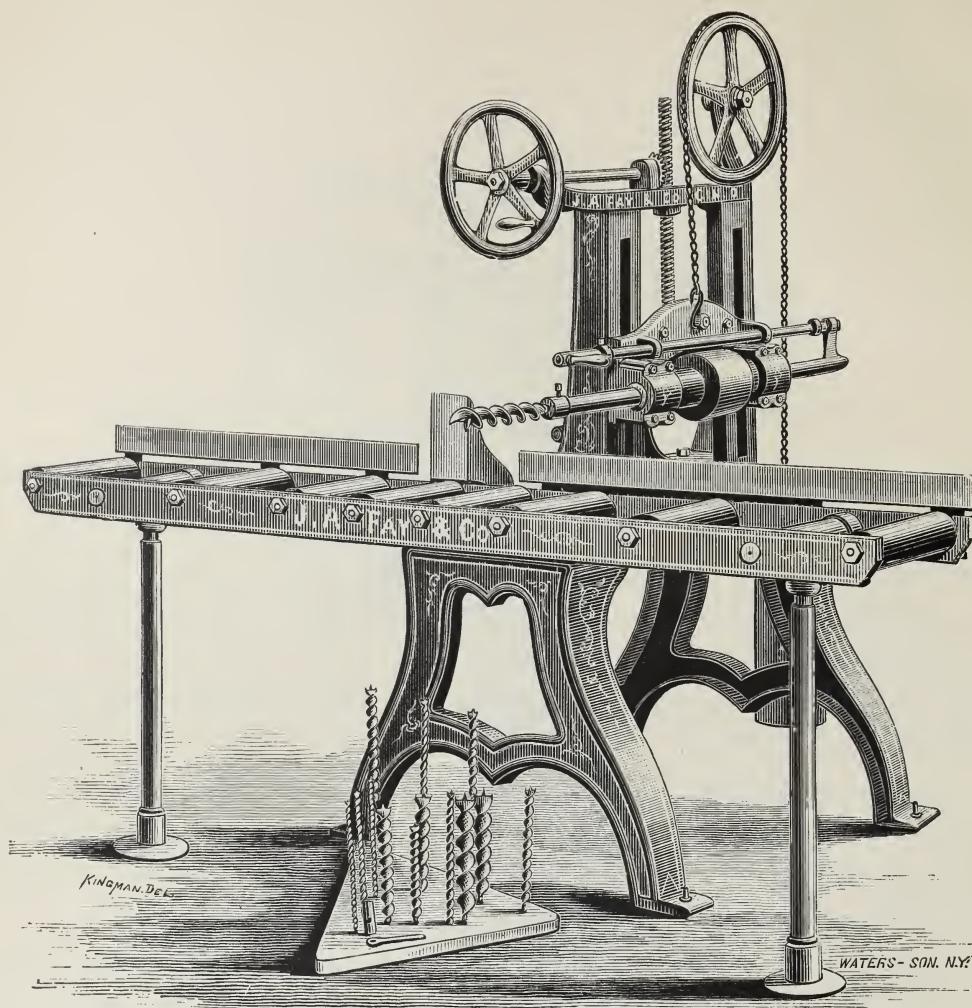
The spindles have a lateral motion over the timbers of ten inches, their frames are placed upon plain slides, the central one being worked by a screw, the outside ones by rack and pinion, each having a convenient hand wheel, and are adjustable separately.

The boring spindles have a vertical motion of eighteen inches, with collars, for indicating depths to be bored. They have handles for operating and counterbalanced levers to return them after boring.

The spindles are all driven by one belt. The center spindle has a large pulley, and is intended to be run at a less speed than the others, as it is designed for the largest bits.

The table has a series of rollers, to move the timbers upon, a guide at the back, and stops above, to prevent the timbers from lifting when being bored.

The tight and loose pulleys are ten inches in diameter, four inches in face, and should make 475 revolutions per minute.



Horizontal Car Boring Machine.

(WITH TRAVERSING STEEL SPINDLE, WROUGHT IRON TABLES, ETC.)

This machine is intended for general framing purposes, more particularly for car and other railroad work, including bridge and heavy truss framing, and has no superior.

It is built from original designs, and in the most heavy and substantial manner, wholly of iron and steel, including the table, the rails of which are wrought bars.

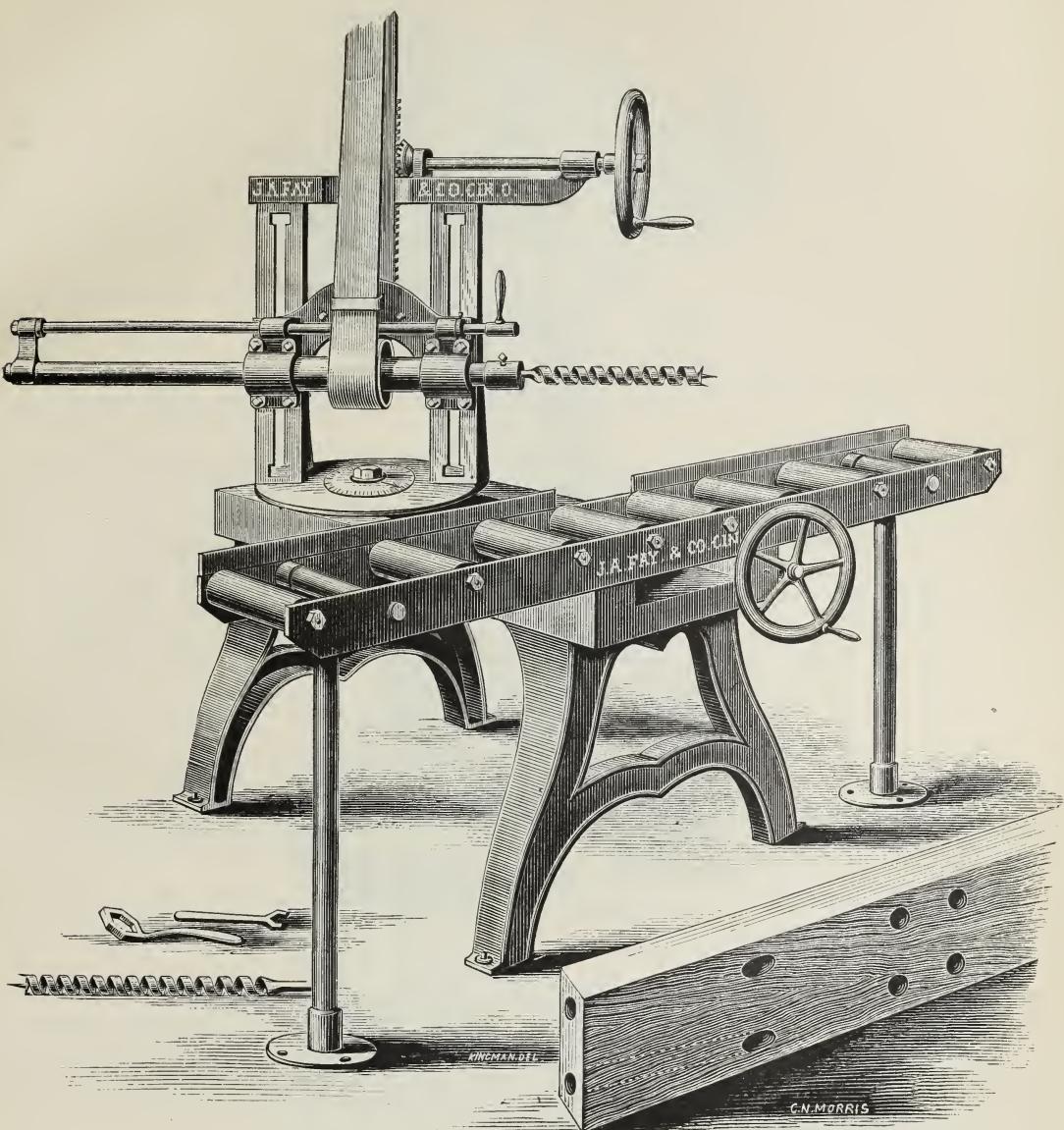
The timber rests on rolls, and is always on the same plane. The boring head and bit is arranged to adjust vertically without altering the belt tensions.

The spindle is cast steel, of large diameter, and has a movement of 17 inches; bored to receive a $\frac{3}{4}$ inch shank, and is provided with a steel bush to reduce the chuck to $\frac{1}{2}$ inch for smaller bits.

The head is counterbalanced by a weight, and is quickly adjusted by a hand-wheel and screw of coarse pitch. By this means of adjustment, the bit is brought to a point with accuracy and with great ease.

No friction clutches or other perishable devices are used, and all the machinery is above the platen, therefore free from chips. The whole running parts consists of the spindle and two idler pulleys, which run on steel taper bearings, fitted in gun metal boxes.

The machine is furnished with nineteen auger bits and small countershaft with pulleys, and is complete in every particular. The tight and loose pulleys on the countershaft are 8 inches in diamter 4-inch face, and should make 500 revolutions.



Radial Horizontal Car Boring Machine.

(FOR RADIAL, STRAIGHT, AND END BORING.)

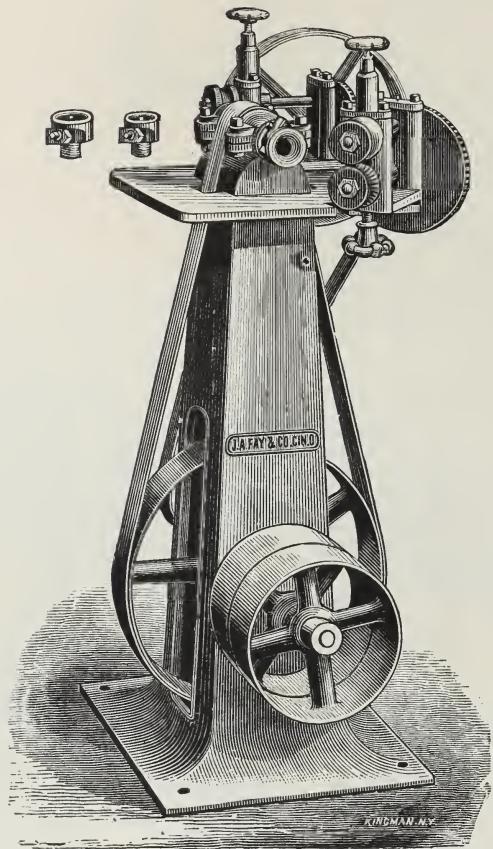
This is a new machine, and is designed particularly for car and bridge work, for straight, angle, and end boring. It is well known in car shops that the holes in truck and body bolsters for the truss rods, are among the most difficult to be bored.

This machine will bore every kind of straight or angle holes required with the greatest ease and facility and without moving the timber, all the necessary adjustments being made with the head and spindle carriage. The boring spindle has a horizontal movement of twenty-four inches, allowing holes to be bored to that depth.

The head or carriage has a horizontal movement in planed sides in the frame, which permits it to be brought close up to the stuff when doing angle work. The head is raised and lowered by a hand wheel, geared to a screw of coarse pitch, by which means the auger is brought to the exact point desired without changing the position of the timber.

The belt is kept at the proper tension by means of a weighted pulley hung in a slack loop of the belt, which allows the boring arbor to be moved either up or down; or to any angle desired.

The countershaft is so constructed as to allow the head to be moved horizontally on the frame, has tight and loose pulleys eight inches in diameter and four-inch face, and should make 500 revolutions per minute.



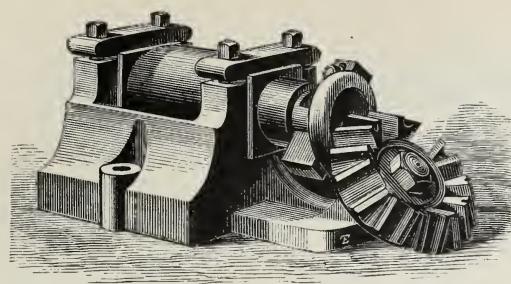
Power Feed Rod Machine.

This machine is constructed from new designs and patterns, designed for turning all kinds of rods, stretchers, or other sticks. It is mounted on an iron column, the counter-shaft being directly under the pulley and chuck, with the driving pulley in the center and entirely out of the way.

The arbor, through which the sticks are fed, and into which the chucks are fitted, is cast in one piece, and fitted into bearings cast solidly to the column. We furnish with the machine, either the receiving rolls to receive the square sticks, or the discharging rollers, grooved to receive and feed out the finished rod, or both, as may be desired.

The rollers are geared and driven from one belt; are easily adjusted to the required pressure for feeding the stuff, and easily removed for different sizes. The receiving rollers can be turned out of the way when changing the chucks, or clearing them of broken rods. We make three sizes, to turn from 15 to 25 ft. per minute; viz: No. 4, to work 1 inch and under; No. 5, to work 1½ inch and under; No. 6, to work 2 inches and under.

Each machine is furnished with three heads and cutters. It has the patent tight and loose pulleys which are nine inches in diameter, three and one half inch face, and should make 750 revolutions per minute.



Hand Feed Rod Machine.

This machine is of great convenience for rounding stretchers, rods, dowels, etc., smoothly and accurately.

The hollow mandrel, or arbor, combining pulley and journals, through which the articles being rounded are passed, is made to receive different sized chucks.

There is a guide and holder for the different sized rods, which prevents the stick from turning in the hands of the operator, while passing it through the chuck.

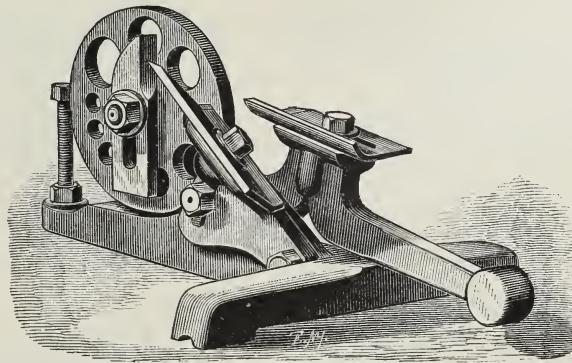
The bearings in which the journals revolve, are of best metal, arranged for perfect lubrication. There are three sizes of these machines, as follows:

No. 1, for $\frac{3}{8}$ in., $\frac{1}{2}$ in., and $\frac{5}{8}$ in. rods.

No. 2, for $\frac{3}{4}$ in., $\frac{7}{8}$ in., and 1 in. rods.

No. 3, for 1 in., $1\frac{1}{8}$ in., and $1\frac{1}{4}$ in. rods.

One size of chuck only is sent with each machine. The pulley on the arbor is three and one-half inches in diameter and face, and should make 3000 revolutions per minute.



Improved Concentric Slide.

These slides are intended to be attached to any ordinary lathe that is sufficiently strong for turning rake, fork, hoe and broom handles, jockey poles, etc.

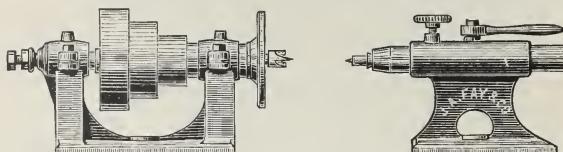
The iron ways sent with the slide are to be attached to shears as may be most convenient. The article turned is finished to its correct form by the knife on the swinging arm, which passes over a pattern fastened to the shears in front. The slide is made to have an authomatic feed by means of a knife attached to the slide, which can be adjusted for any desired speed of feed. We make two sizes as follows :

No. 1, to turn from $\frac{1}{2}$ to 2 inches in diameter; No. 2, to turn from 1 to 3 inches in diameter. They can be fitted up at little expense, are easily kept in repair, and will turn from 800 to 1500 pieces per day more perfectly than can be done by hand.



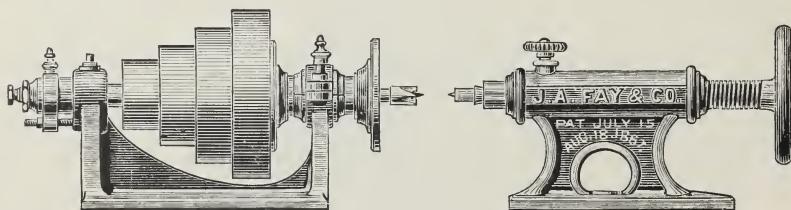
No. 1 . . . 12-Inch Swing.

The tight and loose pulleys on countershaft are 6×3 , and should make 1,000 revolutions.



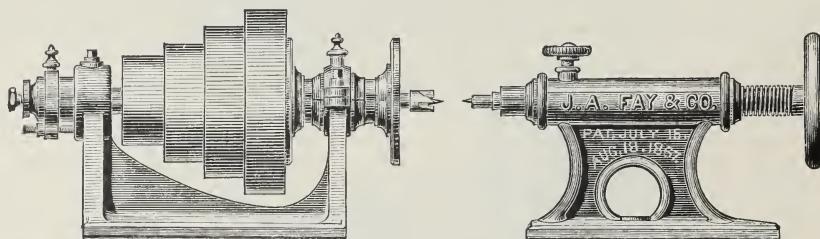
No. 2 . . . 14-Inch Swing

The tight and loose pulleys on countershaft are 8×3 , and should make 725 revolutions.



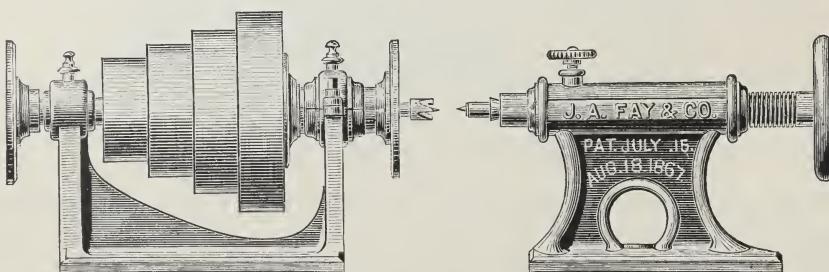
No. 3 . . . 16-Inch Swing.

The tight and loose pulleys on countershaft are 8×3 , and should make 625 revolutions.



No. 4 . . . 20-Inch Swing.

The tight and loose pulleys on countershaft are 8×4 , and should make 550 revolutions.



No. 5 . . . 24-inch Swing. Special Pattern Makers' Lathe.

(WITH DOUBLE FACE PLATES.)

The tight and loose pulleys on countershaft are 8×4 , and should make 500 revolutions.

Patent Victor Wood-Turning Lathes.

(WITH PATENT CONICAL STEPS AND SELF LUBRICATING BEARINGS, ETC.)

Patent Victor Wood Turning Lathes.

(WITH CONICAL STEP BEARINGS, ETC.)

The turning lathes represented by the engravings on the opposite page, of which we make six sizes, are designed and especially adapted for all classes and variety of wood turning in cabinet, sash and door, pattern shops, etc.

The ordinary lathe for hand turning having only a rotary motion, it would seem that there was but little to do to make them more perfect in their construction than they have been; but the heavy bodies revolving with them, besides the weight of the cone pulleys and the pressure of the stuff between the centers, creates a variety friction on the journals, requiring some care to overcome. This has been accomplished to a remarkable degree in our lathes, especially those which have our patent adjustable conical step box on the back end of the spindle.

In the Nos. 1 and 2 lathes the end of the spindle rests in a hardened steel screw of large diameter, which receives all the pressure of the tail stock, and has adequate arrangements for oiling and taking up the wear.

The tail stock spindle is operated by rack and pinion, enabling the pieces to be turned to be put in and removed instantly, and when desired can be bored out its entire length and arranged for boring handles.

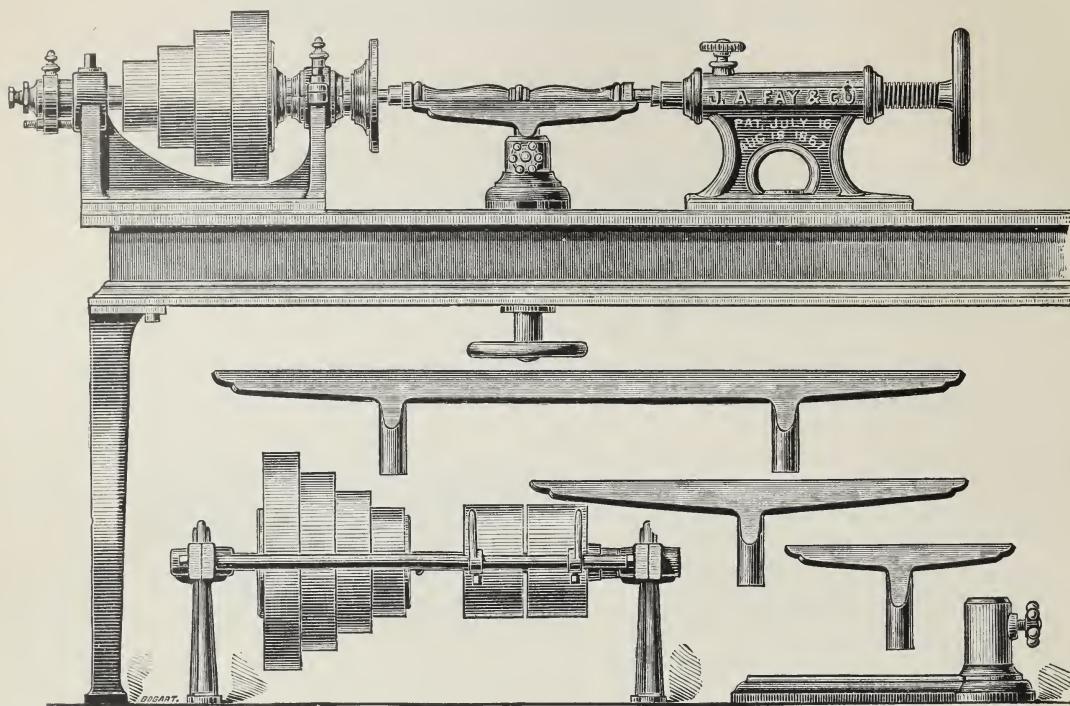
. The cones on the head stocks are made of metal and perfectly balanced, and with fair usage no part of the lathe can be worn out.

The Nos. 3, 4, and 5 are special heavy lathes. The two former have our patent conical step box, which is adjustable to the tapered bearing of the spindle by a screw attached to the end of the box, in the end of which there is a large gun metal screw, which has a separate attachment held to its place by a set nut.

This screw comes in contact with the end of the bearing, in a self-lubricating chamber, which furnishes the step with a constant supply of oil. It receives the entire thrust of the tail stock, and relieves the collars of the other bearing of friction.

The front box is well arranged for oiling, and the bottom of the head and tail stocks are accurately planed upon centers, so that they will be true to line when set on the shears.

The No. 5 lathes are designed for the use of pattern makers, railway and furniture shops, etc., and has a double-face face plate on each end, together with long and short rest for plain turning, floor stand and rests for outside turning, over-head countershaft hangers and pulleys, with improved tight and loose pulleys.



Iron Frame Pattern Makers' Lathe.

This lathe is made entirely of metal, and complete in all its parts, having shears, head and tail stocks with bolts, and convenient screws for fastening to the shears, rests and sockets, countershaft, hangers, etc.

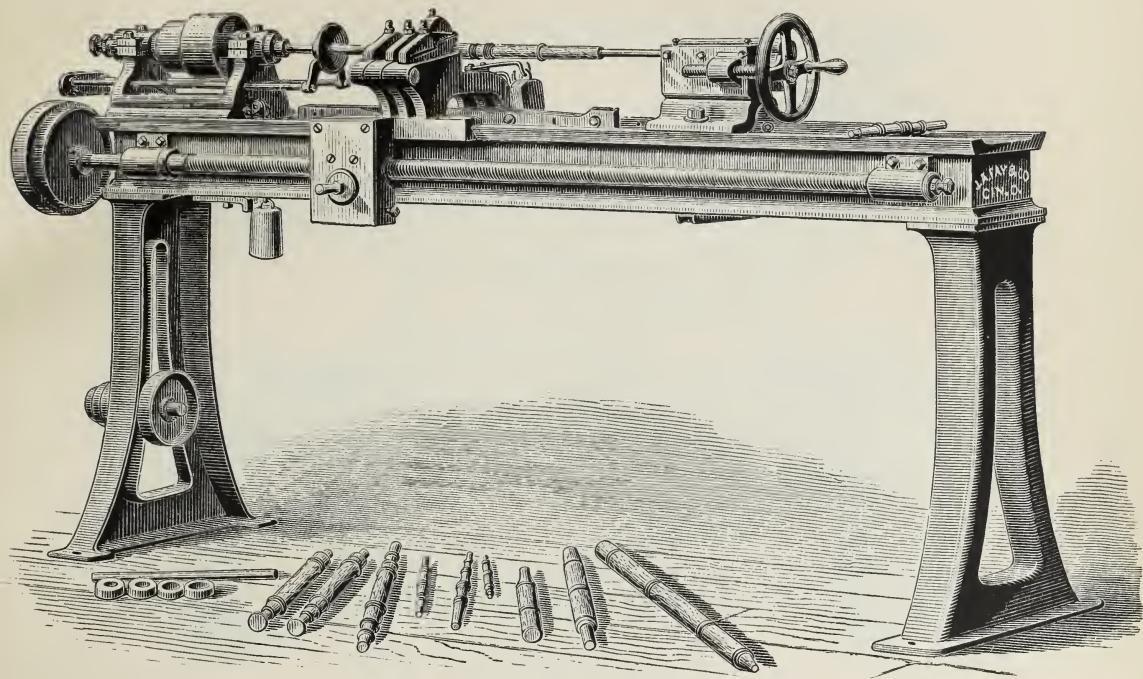
The No. 3 Patent Victor Lathe is the size usually furnished; they are fitted to the shears upon planed ways, which retain the centers exactly in line, in any position the head and tail stocks may be placed.

The-head stock is fitted up, when wanted, with an extra screw on the back end of the spindle, same as shown in the engraving of the No. 5 lathe, page 132, made to fit a face-plate with a left hand screw. Being clear of the end of the shears, large circles can be turned, a separate stand being furnished to receive a rest, which can be adjusted to accommodate the size of circle being turned.

To receive the back thrust of the stuff being turned there is a take-up at the back end of the head-stock, fitted with a screw of gun metal for relieving the collars of the spindles of all friction.

This can be quickly removed when the face-plate is used for turning large diameters. Pattern Lathes No. 4 and 5 of 20-inch or 24-inch swing can be fitted to these shears, or plain Victor lathes for ordinary turning, of 16-inch, 20-inch, or 24-inch swing, as may be desired.

It has an overhead countershaft, with tight and loose pulleys, which, on the 16-inch lathe, are 8x3, and should make 625 revolutions per minute, and on the 20-inch lathe they are 8x4, and should make 550 revolutions per minute.



Automatic Gauge Lathe.

(FOR CHAIR WORK.)

This is a very accurately fitted and perfectly constructed machine, and can be worked by any ordinary machine operator. It will turn all kinds of chair work and other irregular forms with great rapidity and exactness.

It consists of an iron frame with planed ways, upon which are head and tail stocks, a tool rest and apron, carried back and forth by a heavy screw.

The head-stock carries a steel spindle in long bearings, a cone pulley with two speeds for driving, and a small pulley for the feed belt. There is a self-centering attachment, which receives and centers the material without stopping the machine.

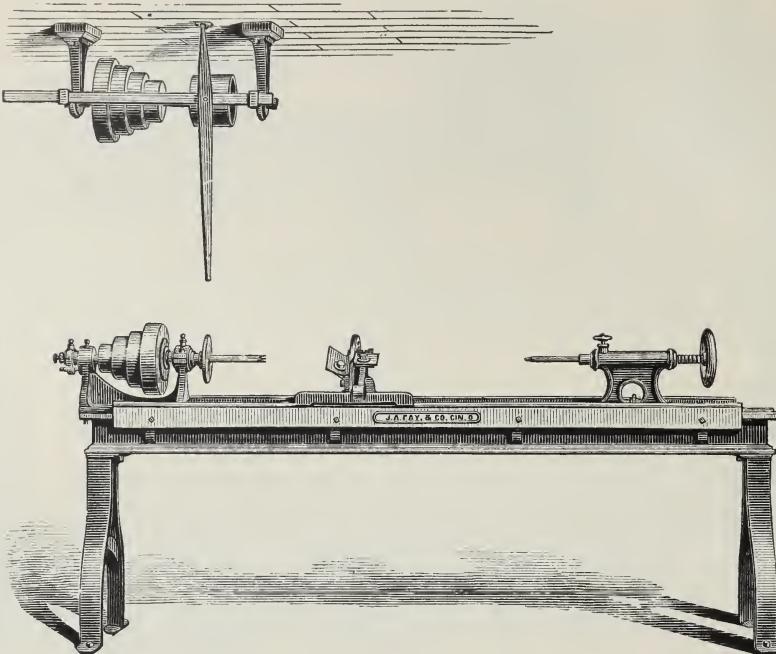
The tail-stock center is arranged to revolve with the turning-stick, making both centers live. It can be oiled and adjusted easily, and the frame which carries it is moved on planed ways on the tail-stock by a hand wheel and screw.

The tool rest is gibbed to the planed ways of the frame; it carries three cutters and the supporting ring, and is moved either by hand or automatically fed by a heavy screw, speeded from the head spindle. The automatic feed is slipped off or on by a handle in the apron in front.

The patterns are usually cut from sheet-iron, and can be changed and replaced instantly without the trouble incident to the ordinary mode of adjustment, and are an exact profile of the finished article.

Each lathe is furnished with five die rings and one extra tail spindle. Countershaft is extra.

It has the patent tight and loose pulleys, which are eight inches in diameter and five-inch face, and should make 750 revolutions per minute.



Iron Frame Broom Handle Lathe.

(WITH CONCENTRIC SLIDE.)

The above cut represents an iron frame lathe with a concentric slide and ways attached. It is one of the most simple machines for automatic turning. It has an iron frame corresponding in length to the length of the articles to be turned, whether rake, broom, hoe, or fork handles, single trees, jockey sticks, or chair stuff. It has the No. 4 or Victor lathe head and tail stock, with long centers, to allow the slide knives to clear the end of the stick being turned.

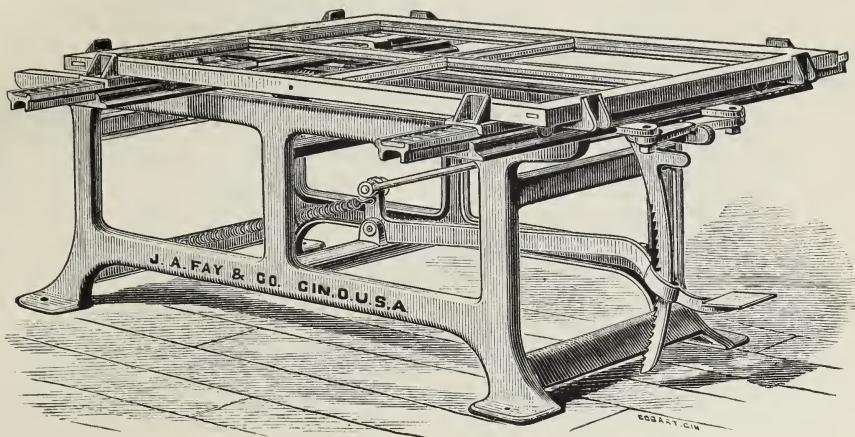
The ways are a round rod which is fitted into semi-circular grooves in the guide arms of the slide, and a flat bar upon which the elevating screw travels, and are arranged to be detached, and the lathe to be used for ordinary hand turning.

The stick is turned down to the size of a guide hole, which sustains it in a central position while the finishing knife completes it to the size and form desired. The finishing knife is attached to a vibrating arm which moves over a pattern attached to the front way of the machine.

The slide has a knife, which, when set at a proper angle to the stuff, makes it self-feeding ; this knife is adjustable to make it feed as may be desired.

The holes in the guide plate of the slide are made to receive from one-half inch to three-inch sticks, according to the size of the machine. Extra long centers, face plate, rests, countershaft and hangers are furnished, when wanted, when fitted with a No. 4 lathe.

The overhead countershaft has tight and loose pulleys, which are eight inches in diameter and three-inch face, and should make 550 revolutions per minute.



Sash Clamping Machine.

This machine we have gotten up at the solicitation of our customers, who have long felt the want of a good, strong, reliable machine that would stand the rough usage incident to this kind of work without frequent breakage.

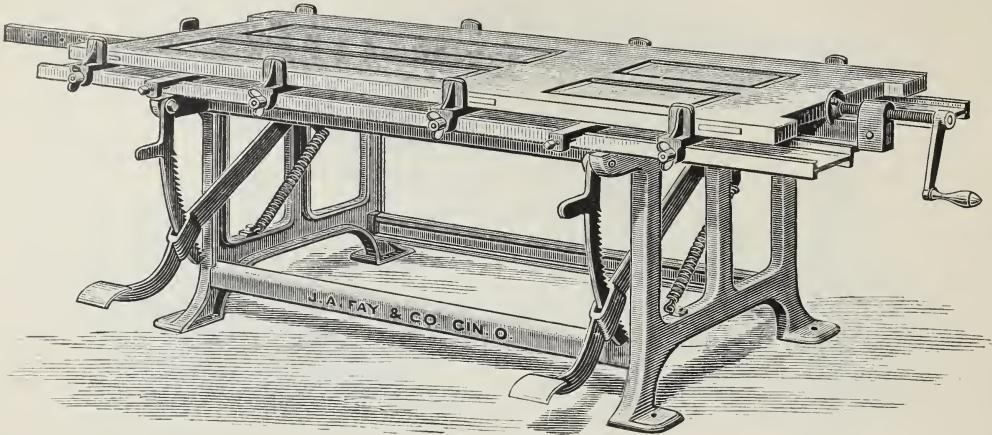
It is designed for clamping sash together, for gluing, wedging, and pinning. It is constructed entirely of metal, is very heavy and strong, and all its working parts carefully fitted to perform with accuracy the work to be done.

The sash is clamped at one movement of the treadle which moves all the corners at the same time.

The side clamps are operated by four bell crank levers, at the same time, the ends are moved by the treadle.

The treadle is held in place by means of a notched segmental bar which catches as the treadle is pushed down. On being released the treadle is raised and held in position by a spring. The machine is easily operated, and does its work in a thorough manner.

The capacity of the machine is for sash up to four feet nine inches wide by six feet six inches long.



Improved Door Clamping Machine.

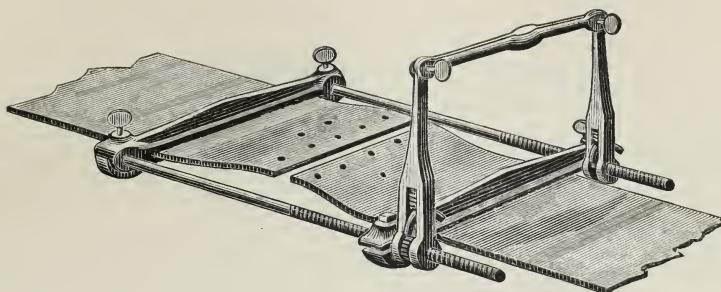
This machine is made in a most thorough manner of wrought and cast iron, intended for the hardest service required, and will clamp any size door up to four feet wide and nine feet in length.

There are two T rails or bars of sufficient length to receive the largest door, upon which are placed adjustable clamping jaws, which can be placed to give greater pressure to the tenons.

Extending lengthwise the machine is a wrought-iron bar, provided at one end with a crank screw and at the other a movable jaw, which is adjustable to suit the length of the door. By turning the crank at the end rails of the door can be clamped as hard as desired.

The pressure on the sides is given by two foot treadles, with notched radial bars, which securely hold them when the pressure is on. When they are released, the treadles return to their position by the action of spiral springs.

The ends are clamped by a screw operated by a crank. It works in the most rapid manner, and all the adjustments are easily and quickly made.



Croft Patent Belt Clamping Machine.

This very useful and desirable little machine is intended for drawing belts together for lacing. It will do the work in one-tenth the time of the old way, and will be found of great utility in any shop. It consists of two pairs of clamps, which are connected by two screws having length enough to allow room between the clamps for putting in the lacing.

The clamps are fastened in position on the belt by thumb screws at each end, the surface of the clamp being concave and convex to give them more adhesive power. After the clamps are fastened they are drawn together by nuts on the connecting screws, provided with ratchets and pawls, by which they are both screwed or unscrewed, or one screwed and one unscrewed, at the same time, the motion of the nut being governed by the position of the pawls, which are set into two levers, operated by a connecting handle.

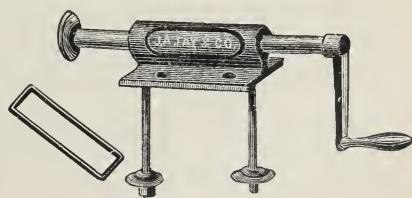
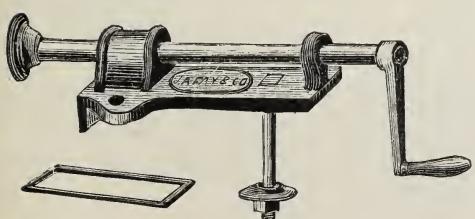
These belt clamps are made of the following sizes, viz:

No. 1, for belts 12 inch and under.

No. 2, " 15 " "

No. 3, for belts 20 inch and under.

No. 4, " 24 " "



Carpenters' Sash and Door Clamp Screws.

Two sizes of these clamping screws are made, the largest for clamping up doors, and the smallest for clamping up sash with either wheels or cranks, as may be wanted. They are very convenient for carpenters, sash, door, and blind makers' use to clamp the work and draw the joints into place.

Wheel and Carriage Machinery.

In the manufacture of wheels, as in the manufacture of furniture, chairs, and other special articles, tools are required which are especially adapted for the production of the largest amount of perfect work with the smallest exertion of manual force.

In our wheel machine department, the tools are constructed to meet the known wants of hub, spoke, felloe, and wheel makers, taking the material in the rough state and carrying it through all the different operations till the finished article is produced. Every machine will perform its work, in the hands of an operator of ordinary skill, in the most perfect manner, pieces being exact duplicates when finished.

There are many machines used for other purposes, which, with or without special adaptations, are used by wheel makers, such as Rip and Cross-Cut Saws of different styles, Band Saws, Scroll Saws, Surfacing Planers, Boring Machines, Turning Lathes, Tenoning Machines, etc. These require but little modification in their construction to meet the wants of wheel manufacturers.

The specialties are numerous for a full line of tools.

For making hubs a Cut-Off Saw will be required. The swinging frame is usually the most convenient, where the timber is received in logs; also a Hub Rougher, Turning Lathe, Hub Boring Machine, and a Hub Mortising Machine.

For finishing spokes from the rough timber, would require a Center Sawing Machine, Spoke Lathe, Tenoning Machine with cutting-off attachment, and Sand Belt Machine; these could make the ordinary spoke.

For finishing common wheels, would require a Tenon Truing Machine, Sand Belt Machine, and Wheel Tenoning Machine. For patent wheels, Spoke Tenoning, Spoke Throating, Spoke Sizing, and Bevel Felloe Planing Machines will be needed in addition.

For finishing the wheels complete, Boring and Doweling Machine, Felloe Cutting-Off Saw, Spoke Driving Machine, Felloe Rounder, Wheel Facing Machines, Bevel Felloe Planer and Felloe Planers of other kinds, for the sides of the wheel, or the inside or outside of the Felloe, according to the finish and style of the wheels.

In the following pages, will be found descriptions in detail of the most prominent special machines for all departments of wheel making. Those which could be better described in their own classification, will be found by reference to the pages given.

We would call attention to the Bevel Felloe Planer, which planes both sides of the Felloe to the correct bevel, and the outside to the exact width for the tire; the Inside and Face Planer for facing one side and the inside of the felloe, and the Baker Felloe Planer for finishing the outside of the felloe. These are self-feeding machines.

The Patent Spoke Driving Machine is especially worthy of attention. The blow struck by the mallet on the spoke can be graduated to the exact force desired, and controlled as perfectly as a blow struck by a hand mallet. For heavy wheels this machine is indispensable, and for lighter wheels alone, it is a most valuable addition to the economical working of the manufactory.

The Automatic Patent Wheel Machine is an entirely new combination. It not only drives the spoke into the hub, but cuts it off to its proper length, and at the same time rounds the tenon on the end of the spoke for the reception of the felloe.

It is automatic in its operation. With one attendant it will drive the spokes, cut off, and round the tenons on the end ready for the felloe at the rate of from three hundred to five hundred wheels per day. For agricultural work it is unrivalled. It will do the work of twenty men far better than can be done by hand.

The Universal Wheel Facing Machine, for the same purpose as the Bevel Felloe Planer, is a power feed machine, and the felloes, instead of being planed before they are placed on the spokes, are planed to the bevel after the wheel is put together. It planes the tread and one face at the same time, and the joints of the felloe can be left the highest if desired. It is a valuable labor-saving machine.

The Patent Oval Tenon-Forming Machine is for making tenons on the spokes to enter the felloes, having a longer diameter with the grain of the wood in the felloe than across it, obviating the use of wedges, and decreasing the risk of splitting the felloes. It works with the utmost precision.

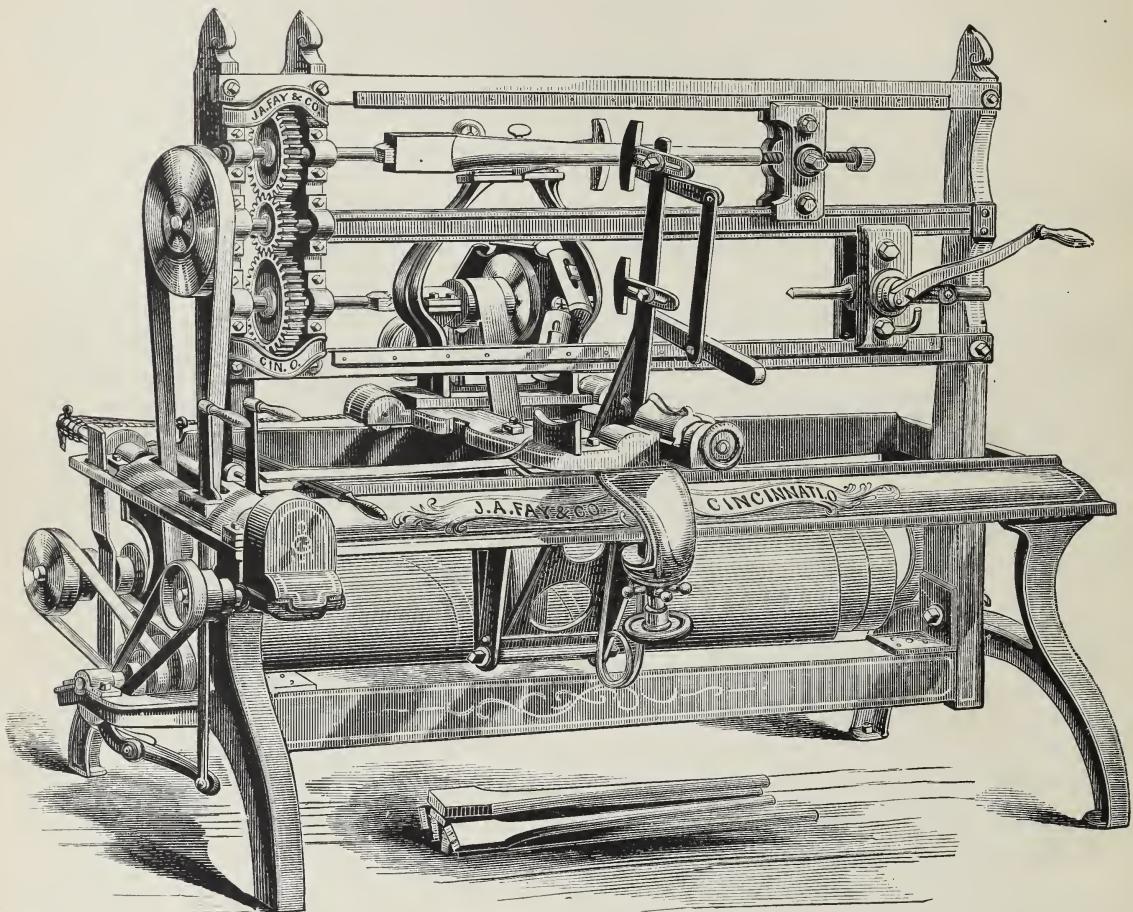
The Felloe or Rim Planer is used for dressing up sawed or bent felloes and reducing to a thickness. The Cornering and Sizing Machine for sizing bent stuff in carriage shops and for rounding and finishing wagon gear. The Concave Felloe Sawing Machine works both the inside and outside of the circle, and will be found an important acquisition in reducing expense and saving material for getting out felloes.

An important addition to our extensive list of wheel machinery is the Morris Patent Bending Machine for felloes and carriage work. It is adapted to every requirement of bending, from the smallest chair stock and carriage material to the largest work required in ship-building. Many hundreds are in use, and they have nearly superseded every other machine. Full descriptions will be found with the engravings.

Several important machines necessary in wheel and carriage work are grouped in their respective classes, and will be seen by referring to the pages indicated below:

Surface Planer, appropriate for wheel work,	see page	30.
Molding and Squaring-Up Machine, No. 3½ Triple Molder,	"	75.
No. 2 Patent Variety Wood Worker,	"	88.
No. 3 Shaping and Molding Machine,	"	107
Special Spoke Tenoning Machine,	"	114.
Hub Mortising and Boring Machine,	"	148, 150.
Patent Scroll Saw, for felloes,	"	160.
No. 2 Patent Band Sawing Machine,	"	172.
Railway Cut-Off Saw,	"	191.
Rip Sawing Machine,	"	196, 200.
Boring Machines,	"	223, 234.
Wood Turning Lathes,	"	232.

Every machine is erected in the very best manner, and many of them have features original with us, which are indispensable for the best quality of work.



LARGE SIZE

Improved Blanchard Spoke Turning Lathe.

WITH DETACHED COUNTERSHAFT, HANGERS, AND PULLEYS, ECCENTRIC CENTERS, CUT
GEARING, STEEL FACED VIBRATING REST, ETC.

LARGE SIZE.

Improved Blanchard Spoke Turning Lathe.

(WITH DETACHED COUNTERSHAFT, HANGERS AND PULLEYS, ECCENTRIC CENTERS, CUT GEARING, STEEL FACED VIBRATING REST, ETC.)

This form of the Blanchard Lathe, for turning irregular shapes, is designed more especially for turning spokes of all sizes, although other forms can be turned from suitable patterns, when required. It is, without doubt the most perfect machine in use for turning all kinds of spoke, pick, hammer, and other handles.

It is constructed in a heavy and substantial manner from improved patterns, the base being made of iron and the vibrating frame of hard wood, so put together as to be strong and durable.

The cutting head is of peculiar construction and carries eight knives, which are so arranged upon its surface as to leave the spoke or piece being turned smooth and comparatively free from ridges, requiring but little finishing on the sand belt.

The head is attached to and runs in a heavy sliding carriage, which is traversed on planed slides by a worm feed, and provided with a changeable feed for tapering work.

The motion of the cutter head carriage is arrested at any desired point by means of a buffer attached to the frame.

The vibrating frame is fitted with heavy cut gearing, for revolving the pattern and piece to be turned. The vibrating rests are faced with steel and are retained to their positions by means of a heavy variable steel spring.

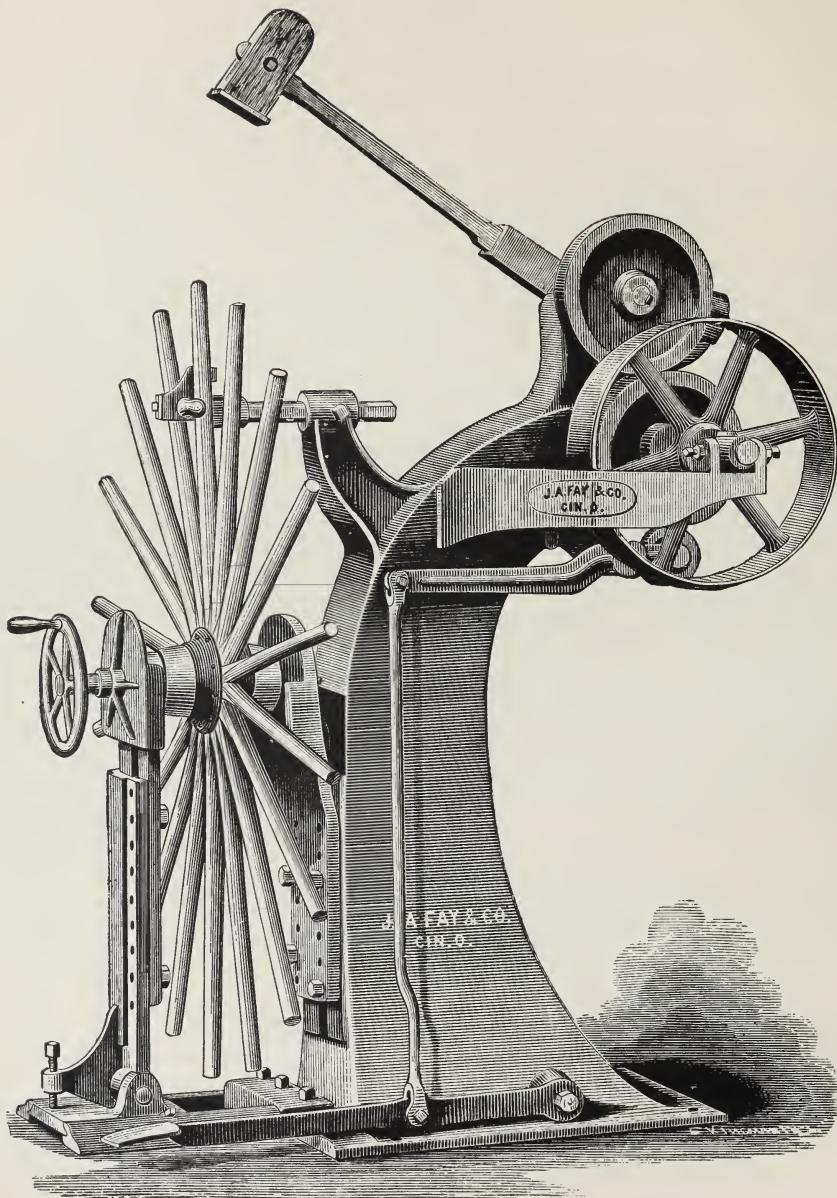
The movable center is operated by means of an eccentric and lever, which is kept in its desired position by means of a ratchet.

The countershaft is made separate from the machine and provided with floor supports, and the drum over which the cutter head belt travels is made of iron, rendering it light and durable.

All the journals are of large diameter, made from best refined cast steel, and run in self-oiling bearings; the centers are of steel, and the wing nuts made of wrought iron.

The capacity of the machine varies from 400 to 900 spokes per day, depending upon the size required, and in its operation and durability has given entire satisfaction wherever used.

The tight and loose pulleys are twelve inches in diameter, four-inch face and should make 400 revolutions per minute.



Hosler's Patent Spoke Driver.

(WITH ADJUSTABLE GUIDE,

GRADUATED DRIVING POWER, ETC.)

Hosler's Patent Spoke Driver.

(WITH GRADUATED DRIVING POWER, ADJUSTABLE GAUGE, ETC.)

This machine is designed for driving all kinds of spokes into the hubs, and making any kind of wheel required in wheel, wagon, or carriage shops. It has been in constant use in some of the very largest wagon and wheel manufactorys in this country for the past seven years, giving unqualified satisfaction.

It is built in the most thorough manner, upon a heavy iron column, with a view to the hard work it has to perform. It requires but one man to operate it, and is easily managed, and any mechanic of medium capacity can learn to operate it successfully in a few hours.

The frames which hold the hubs will receive any size up to twelve inches in diameter, (at the large end,) and are adjustable to hubs sixteen inches in length, and to the height of the wheel by hand-wheel and screws.

The blows are given by swinging mallet or hammer, similar to the blows given by hand, only with much greater force and rapidity, which are obtained by the pressure of the foot upon a treadle.

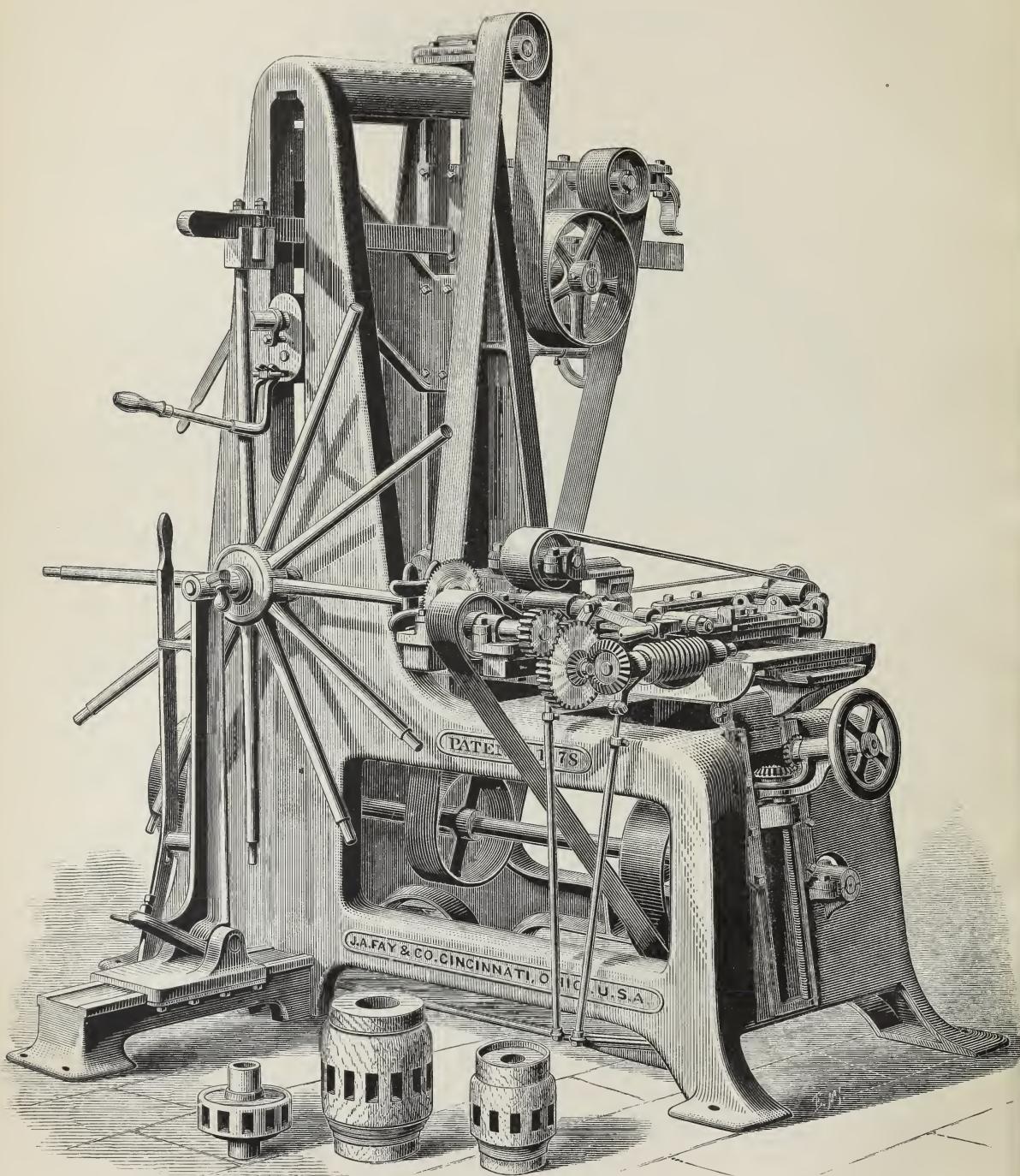
The blows can be changed instantly from heavy to light and from quick to slow, or one blow can be struck very quick and heavy, and the next one light and slow; indeed, they are as easily governed as if the operator had the mallet in his own hands.

The graduation of the blows is so quickly accomplished that the stroke can be changed after the mallet is started, by changing the pressure of the foot on the treadle.

There is an adjustable guide for guiding and truing the spoke being driven, which sets the spoke into the exact position desired, and which is raised out of the way when not in use.

This machine is adapted to wheels from two to six feet in diameter, and is very quickly changed from one size to another. It will do the work of from eight to ten men on medium or heavy wheels, and do it in a more perfect manner, and for the purposes intended will be found unequaled.

The driving pulley is twenty inches in diameter, five-inch face, and should make 120 revolutions per minute.



Corr's Patent Automatic Wheel Machine.

(FOR DRIVING, CUTTING OFF AND TENONING THE SPOKES IN THE WHEEL WITHOUT REMOVAL.)

Corr's Patent Automatic Wheel Machine.

(FOR DRIVING, CUTTING OFF AND TENONING THE SPOKES IN THE WHEEL WITHOUT REMOVAL.)

In manufactories where great numbers of the same class and size of wheels are made, a machine is needed for driving the spokes, sawing them off, and tenoning ready to receive the felloes. We have recently constructed such a machine, in which the combinations are such, that all these operations are performed by movements mostly automatic and completed without removal from the machine.

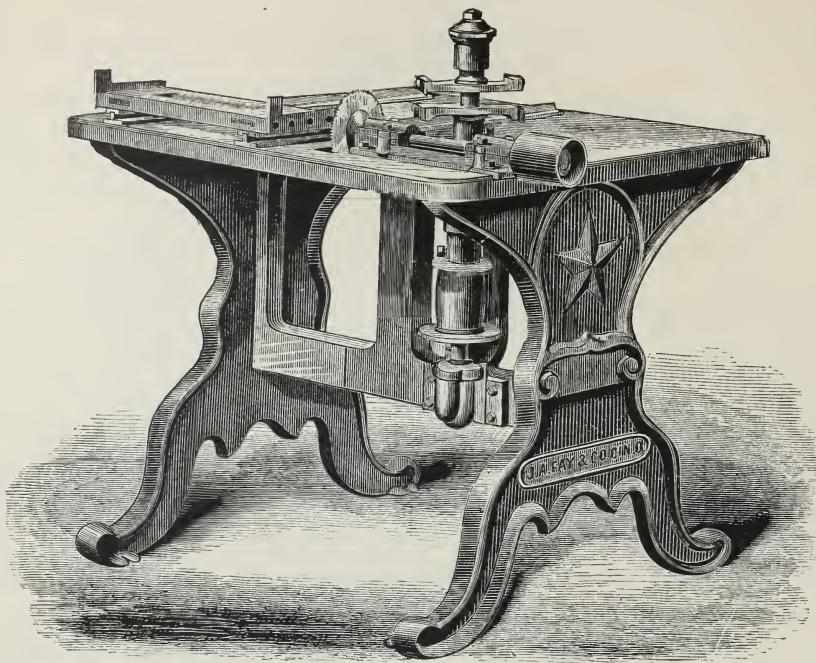
The first operation in this machine is driving the spokes. This is done by placing the hub upon a stud or shaft near the center of the vertical frame, having an outside bearing movable at its foot by a lever. The spokes are driven by a mallet, the force of the blow coming from a spring and eccentric which forces the mallet down after being raised by a cam, the mallet striking one blow at each revolution. A spring stop serves to hold it when not in use. The force of the blow is regulated at will. The spoke is supported on its rear side by a guide which is adjustable to suit the angle or dish, and to hold it steady while being driven by means of a forked lever the prongs of which act on each side of it. Upon the right hand of the machine is mounted a supplemental frame attached to the frame pivoted to the stud or shaft to which the hub is attached.

This frame carries the apparatus for sawing off and tenoning the spokes. The outer end is provided with a screw and bevel gears for raising and lowering the frame and making such adjustments, as may be necessary to suit different sized wheels. The object of this adjustment is, that while one spoke shall stand vertically directly under the hammer, and is being driven, the saw shall be directly opposite the end of one already driven, so it may be operating upon it at the same time.

As the frame moves upon a center, which is the center of the wheel, it will be readily seen that with the slightest adjustment, the saw will always be in line with the spoke to which it may be opposite. Gibbed to this hinged frame is another having a lateral movement, on which is mounted the cutting-off saw, and tenoning apparatus. The hollow auger is provided with cutting lips for forming the tenon on the end of the spoke combining the sawing and tenoning tools in one. The sliding movement of this frame is effected by means of a treadle near the base. The operator can at any time, by simply pressing his foot on the treadle move the sliding frame outward, and thus bring the saw in contact with the spoke and cut it off. The saw with its frame being carried back as soon as the foot is removed from the treadle, by a weight. After the spoke is driven, the hub is revolved and another driven and the hub moved over again, when the first spoke passes between guides which hold in the line of the hollow auger. By depressing the foot lever, the combined saw and hollow auger move forward sawing off the spoke and holding it between two horizontal guides, when the hollow auger arrives in line with the spoke it is automatically moved up by a screw cutting the tenon complete. These operations continue until the entire wheel is completed.

With this machine one man can drive, and saw off, and make the round tenon on the end ready for the reception of the felloe at the rate of from thirty to forty wheels per hour, depending upon the size, saving the labor of several men.

The tight and loose pulleys on the countershaft are fourteen inches in diameter and five-inch face, and should make 200 revolutions per minute.



Improved Spoke Tenon Truing Machine.

This machine is intended for truing or sizing the tenons of spokes, and for cutting off the tenons to the desired length at one and the same operation. The upright spindle has two cutter-heads, the upper one having a vertical adjustment for the variations in the thickness of tenons as required. This adjustment is obtained by means of the large nut on top of the spindle.

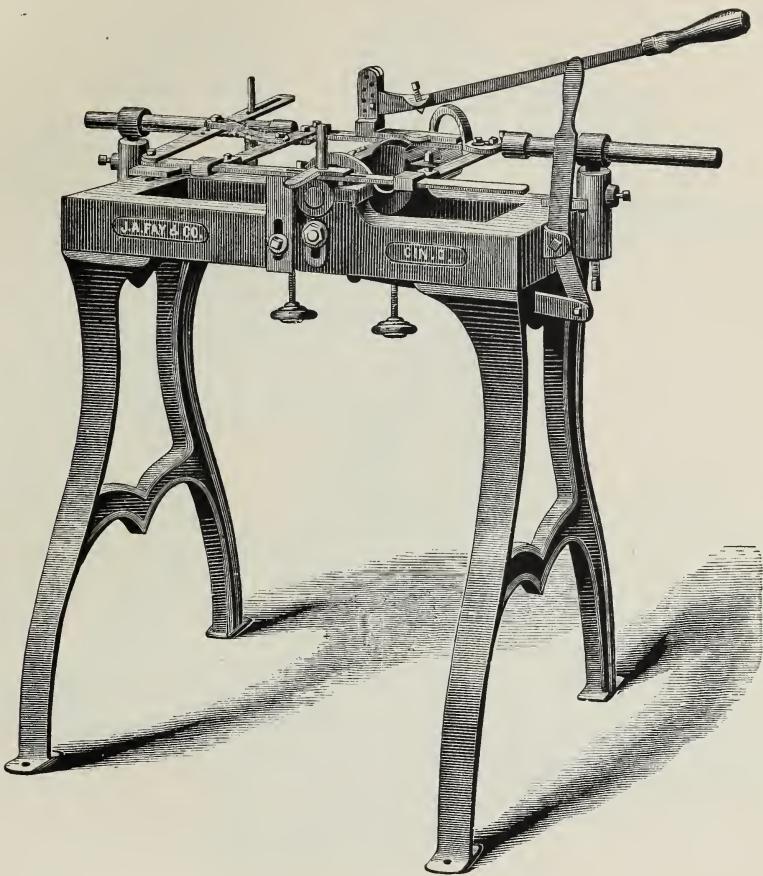
The spoke to be worked is laid on the small sliding table, held firmly by the hand, and passed by the saw which cuts off the end of the tenon, and then passed between the two cutter heads which brings the tenons to the proper size.

The rest on outer end of the sliding table is adjustable up and down for different sizes of spokes.

The rest near the saw is made thin on its upper edge, and the shoulder of the tenon is pressed firmly against it.

The knives on the cutter-heads are set out, so as to just clear the rest, in order to cut as near the shoulder as possible.

The tight and loose pulleys are ten inches in diameter and five-inch face, and should make 420 revolutions per minute.



Spoke Throating Machine.

This machine is intended for shaping and smoothing the throats or necks of spokes, preparatory to insertion in the hubs.

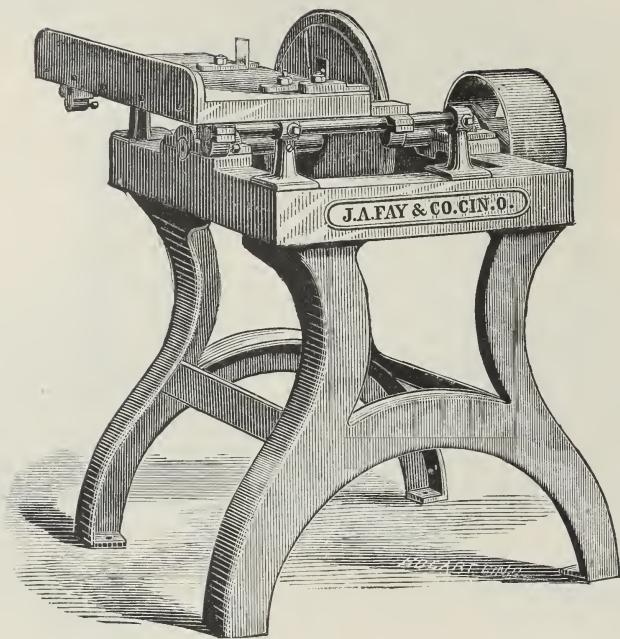
It has an iron frame, and is strong and durable in all its parts. The cutter-head revolves on a steel shaft, running in self-oiling boxes, and can be so constructed as to make the throat of any desired shape.

The frame upon which the spoke to be throated rests is made of wrought iron, and hinged on a slide bar which passes back and forth over a guide, which, in connection with the knives on the cutter-head, regulates the shape of the throat.

The spoke is placed under a lever and held firmly while passing back and forth. Ordinary spokes can be throated on both sides by simply changing the guard, which is accomplished by the hand lever at the end of the machine, in easy reach of the operator.

All the adjustments are easily made, and it will be found well adapted to the requirements of wheel manufacture.

The pulley on the arbor is three inches in diameter and one-half inch face, and should make 4,000 revolutions per minute.



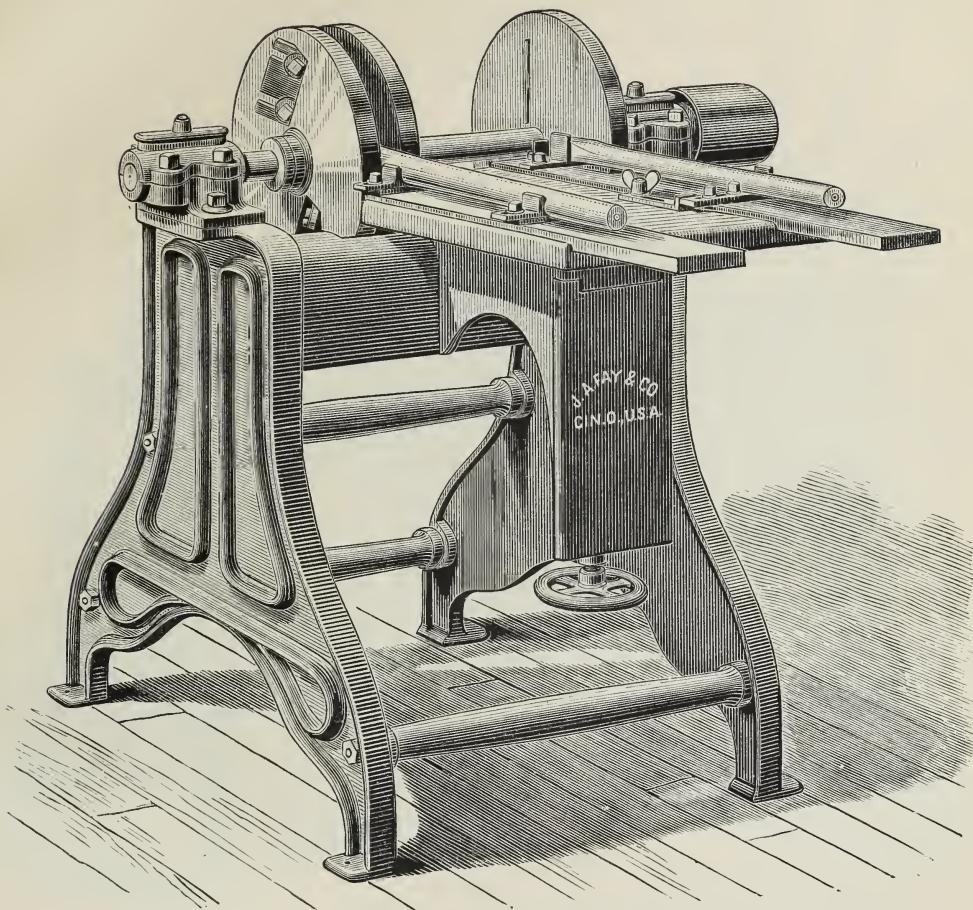
Spoke Facing and Jointing Machine.

This machine is designed for facing common spokes, or for facing patent spokes, and finishing the miter joint on them. It consists of a large cast iron disk, in which are placed three cutting knives.

The disk is revolved, and the spoke, being placed in position on the table, is brought into contact with the cutters, finishing it instantly to the desired surface or angle.

The table is light and moved on parallel ways, placed at right angles to the face of the disk, and has a spring which returns it from the disk when the cut is completed. It is furnished with necessary stops and guides, and for the work designed has no superior.

The pulley on the disk shaft is ten inches in diameter and five-inch face, and should make 1,440 revolutions per minute.



Spoke Bevel Tenoning and Facing Machine.

(FOR AGRICULTURAL WHEELS.)

This machine is intended for preparing spokes which are to be placed in iron or wood hubs, and is suited to every kind and class of wagon, carriage, or agricultural implement wheels.

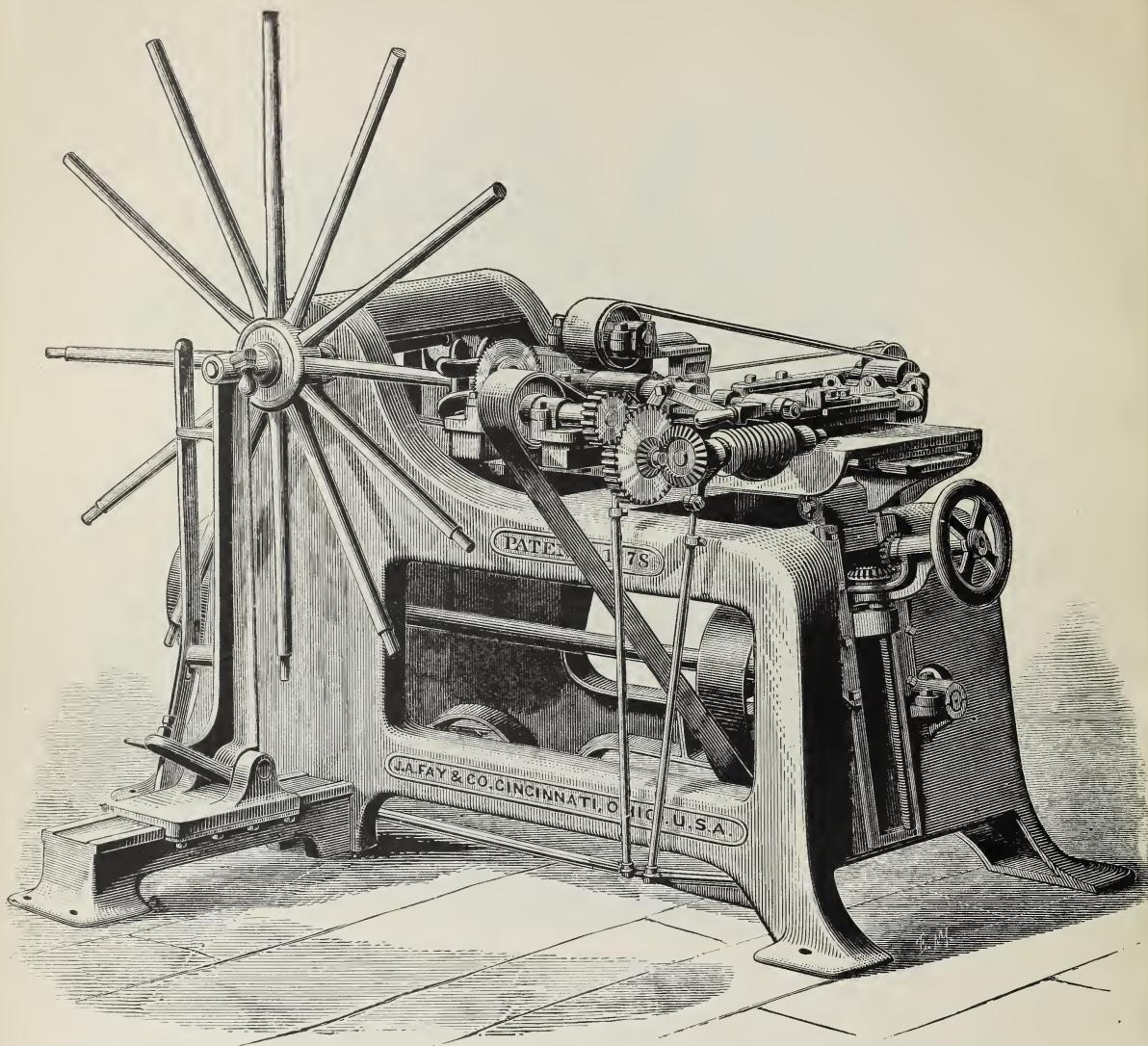
The arbor is placed on a strong and heavy frame, and runs in bearings arranged for perfect lubrication. There are three heads with two knives, one of which is used for jointing the edges of the spoke.

The stops on the blade are adjusted to correspond to the bevel of the mortise, and also stops arranged to regulate the width of the spoke. Two of the heads are placed facing each other. The faces of the heads are made at an angle to suit the angle of the sides of the mortise.

The length of the bevel on the spoke is determined by the distance between the heads, and the arrangement of the stops allowing the table to pass between the heads. The sliding tables are very light and easy to handle.

There is an adjustment, vertically, of the tables for changing the angle of the cut so that a clean surface may be made.

The pulley on the arbor is five inches in diameter and five-inch face, and should make 2,000 revolutions per minute.



Improved Automatic Wheel Tenoning Machine.

This is an invaluable machine for wagon, carriage, and agricultural implement shops. It is designed to saw off the spokes in the wheels to a uniform length after they are driven into the hub, and also at the same time to make the round tenon on the end for the felloe.

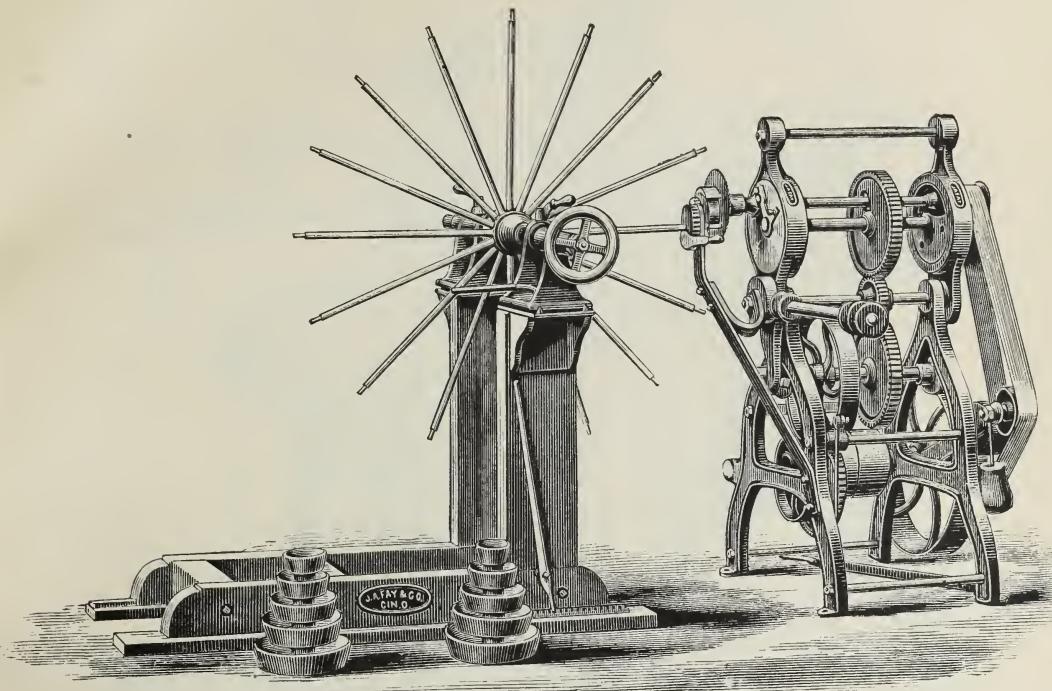
The hubs of wheels for wagon and carriage work are made to hold between taper cups. For agricultural wheels the hubs are held on an arbor by a spring catch to facilitate quick removal.

The frame carrying the cut-off saw and hollow auger swings from the center of the hub, and can be quickly adjusted to work any diameter of wheel up to forty-eight inches.

The machine is entirely automatic in its operation, positive and sure. When the wheel is in position, by pressing upon the lever in front, the saw moves forward and reduces the spoke to its proper length. The instant this is done the hollow auger moves forward and forms the round tenon to any length required, and returns to its position ready for the next.

With this machine, one man can cut off and tenon from one to two thousand wheels per day, depending upon the size.

It is supplied with countershaft with tight and loose pulleys twelve inches in diameter, and five-inch face, and should make 600 revolutions per minute.



Patent Oval Tenon Forming Machine.

This machine is designed for making oval tenons on the ends of spokes where they enter the felloe. The diameter of the tenon is longer with the grain of the wood than across it. The oval form of tenon reduces the risk of splitting the felloe in driving it on the tenon, and insures the necessary friction to hold the felloe to its place without the necessity of wedging.

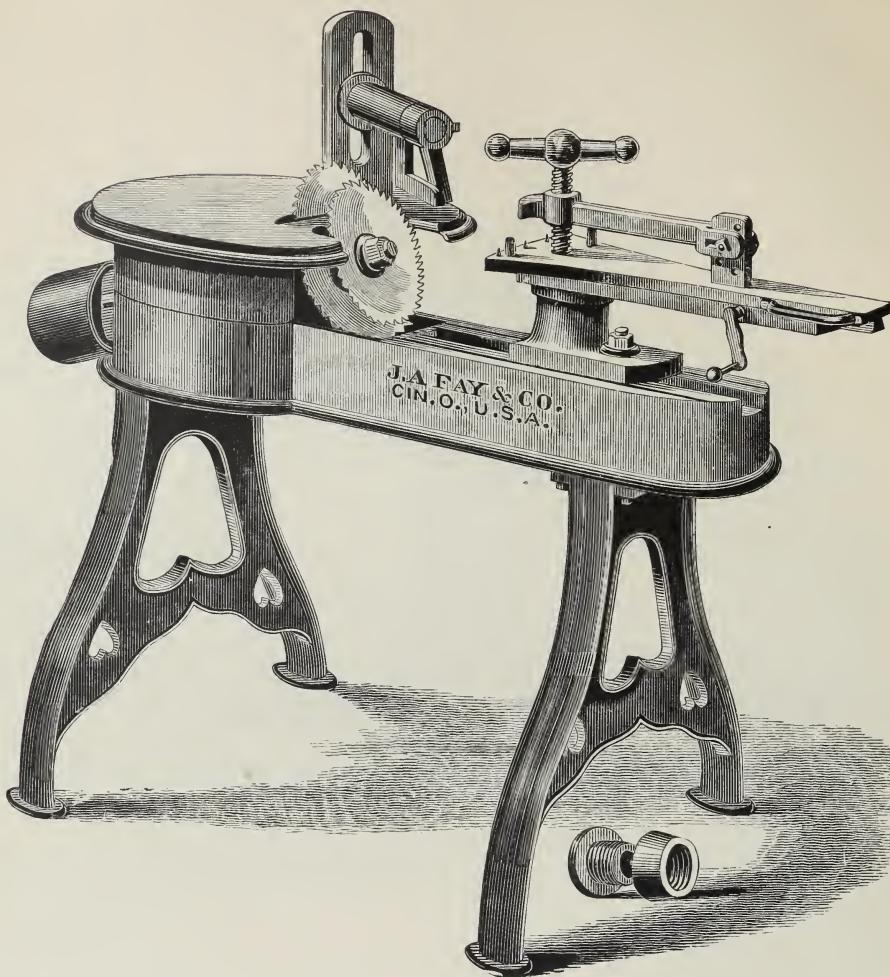
The wheel is held between chucks which receive the ends of the hubs, and are supported on a sliding frame, which can be adjusted to cut the spokes to the desired length. The spoke being operated on, is held between two geared clamps, which open and close simultaneously, bringing the center of any sized spoke to the center of the revolving disks.

The upper part of the machine which carries the cutter-heads, has two disks, which are revolved by a series of cut gearing, governed by a lever for the foot, which acts upon friction pulleys and under control of the operator.

The arbor on which the cutter-head and saw are secured, passes through the revolving disks near their peripheries, the boxes in which it runs being secured to the disks, but adjustable by means of cams for the different tenons.

The upper part of the machine in which the disks revolve, has a vibrating motion given to it by the weighted hand lever. By depressing this lever, the cutter-head is brought forward, the saw cutting off the end of the spoke and bringing the cutter-head up to the spoke, cutting the oval, which may be varied in size, to suit the work required.

The tight and loose pulleys are nine inches in diameter and four-inch face, and should make 355 revolutions per minute.



Patent Concave Felloe Sawing Machine.

This machine is especially designed for sawing, from the plank, all kinds of felloes. Economy is shown by rapidity of execution, small amount of waste, and the fact that high-priced, skilled labor is unnecessary, as any person can operate the machine and produce perfect work. The main arbor is of large diameter, supported at one end in a pivoted bearing, capable of adjustment and movement in a vertical plane on the axis of its bearing.

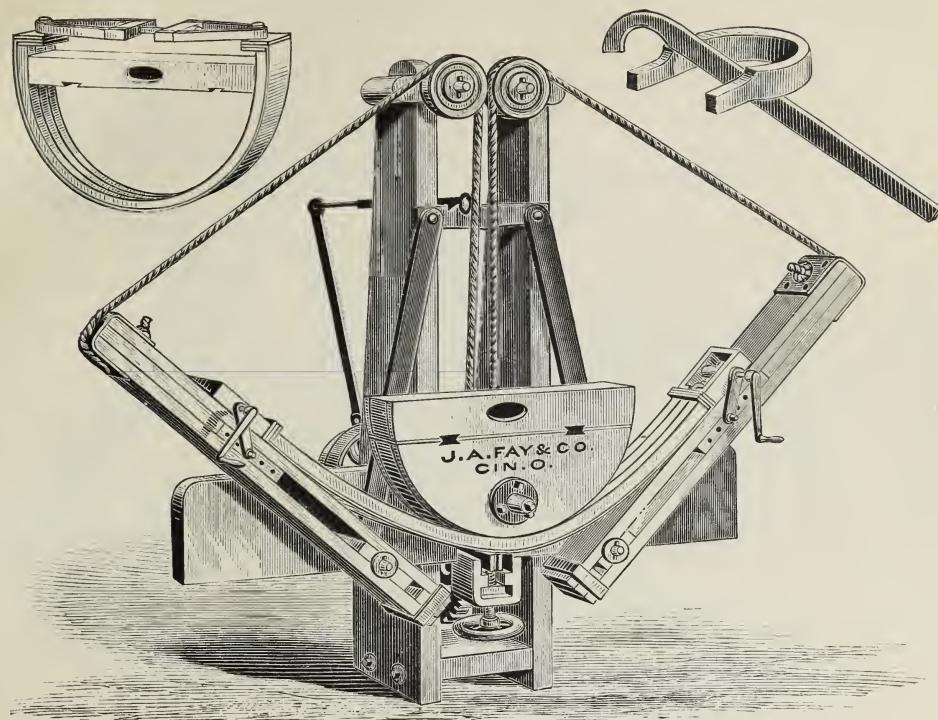
It has two concavo-convex saws, secured to a heavy arbor by fixed and movable collars, so arranged that the collars will only bear at their outer edges which are rounded, the curves being less than the curvature of the saw. Any size saw can be used, and quickly changed for cutting felloes for wheels of various sizes; each set of saws being necessarily curved for felloes of wheels of one size.

The timber is secured upon a vibrating carriage, which is supported on a stud, and is readily adjusted to or from the saws, for felloes of different diameters. The support itself forms a slide upon which the carriage is moved to and from the saw, and the plank is entirely cut up, without waste or resetting after once being clamped.

The work from this machine is as true as a turned piece. Any desired radius is quickly obtained without possibility of deviation from a true circle.

It is simple in construction and operation, and will last a life-time. It will easily saw from 2,500 to 3,000 wagon felloes per day.

The pulley on saw arbor is eight inches in diameter, and six inch face, and should make 875 revolutions per minute.



Morris Patent Wood-Bending Machine.

This Machine is intended for bending all kinds of felloes, chair, wagon and plow material, etc. The principle involved is the bending by levers from the center outward.

The levers connect with an iron bending band their inner ends supported on fulcrum pins, projecting from the lower ends of two links pivoted to the face of each standard. The levers, when level, form a table upon which the wrapper is laid to receive the straight timber; the wrappers or band heads, with the lever abutments, control the end expansion of the wood while being bent.

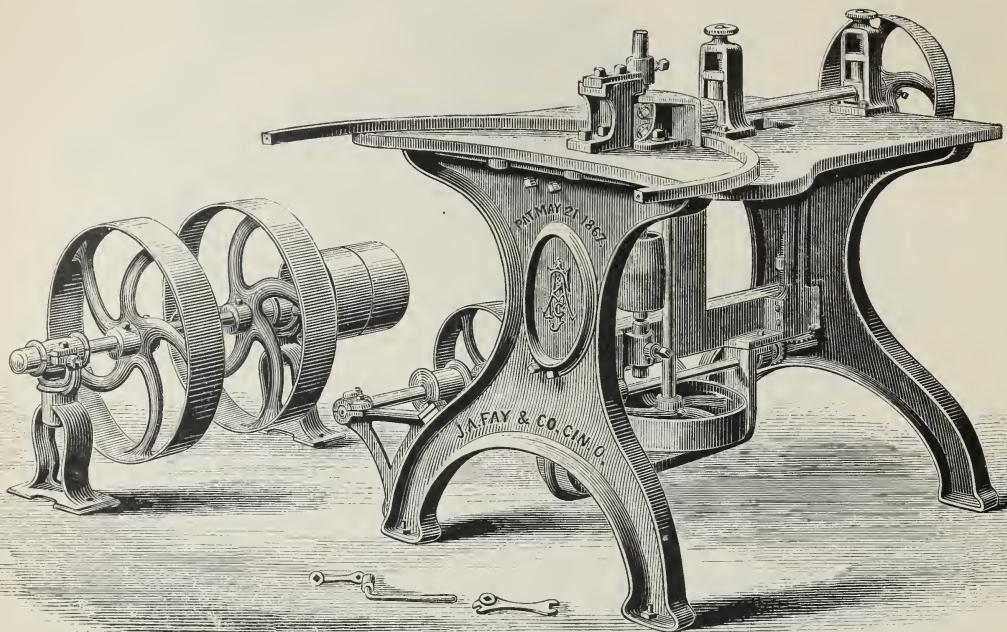
The abutments are adjusted by means of eccentrics and cranks, but oftener by wedging in the slots. A wheel and drum, on which the cord is wound, revolves on a shaft having proper bearings. The cord is connected to the outer end of the levers and reeved through the eye of the wheel over the sheaves.

The wheel is driven by a worm and shaft having two loose pulleys, that are clutched by means of a shifter, for raising and lowering the levers.

The Bending form is made in two parts, upper and lower, the lower part when bending remains on the machine, and any desired number of upper parts of the form, to match the lower part, can be used in lieu of whole forms, the upper part being always taken off with the bent wood which is held in true shape inside the wrapper-band by catches or loops until the new shape is set.

The hand-wheel beneath sets the wood up to the form at the point of beginning to bend. For light bending, hooks are riveted on the ends of the band, and match hooks on the levers, so that when hooked together, the ends of the levers, form the abutments. These are chiefly used for chair rims, buggy seat rails, thwart knees, carline braces, sometimes for shaft heels, and plow handles.

But in all, the lever supports and guides the timber around the non-rotative form, led by the cord, whilst being wound upon the drum, effecting the bending from any point within the length outward towards the end or ends of timber.



Inside and Outside Rim Planing Machine.

(FOR BENT OR SAWED FELLOES.)

This machine is constructed in the most substantial manner, almost entirely of iron and steel, and is intended for making the first cut on bent or sawed wheel rims. It planes the inside and one of its sides square with each other at the same operation

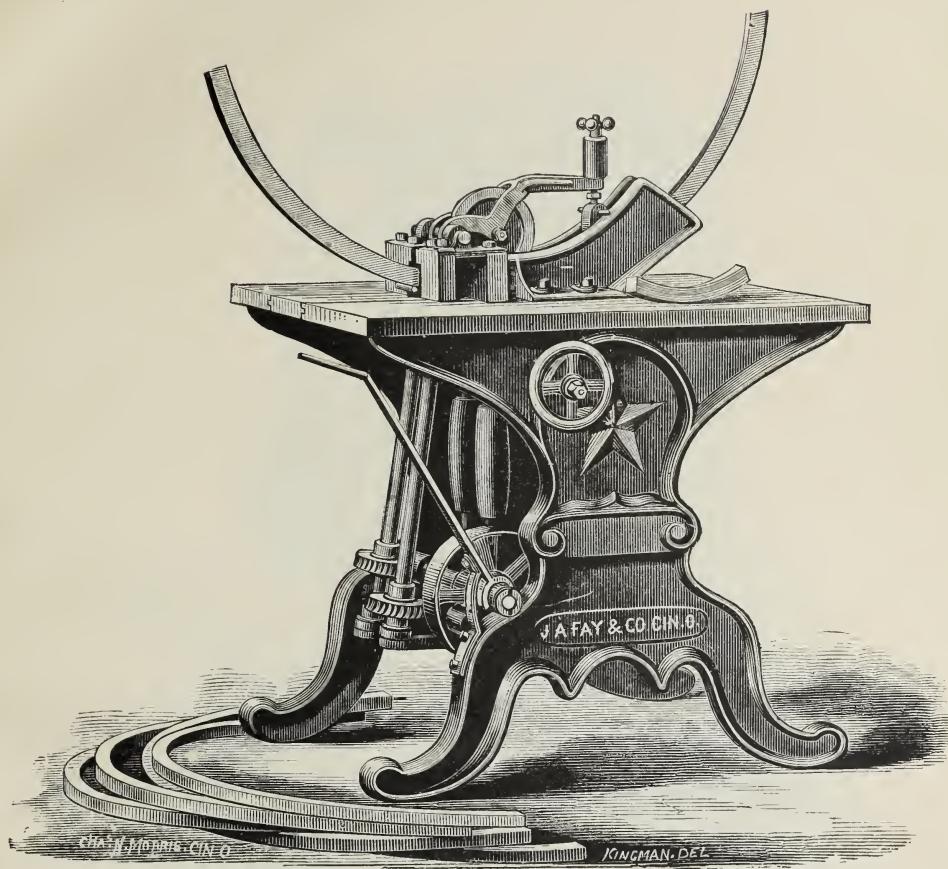
It has a vertical and a horizontal arbor on which the cutter-heads are secured; also vertical and horizontal feed rolls.

The cutter-heads are easily accessible, and can be taken out in an instant, by simply loosening two set screws, for the purpose of changing, grinding, or setting the knives.

The under head is raised or lowered by means of hand wheels, and the upright head is arranged so as to take a larger or smaller cut, as may be desired.

It is adjustable for all different sizes of rims, is indispensable in a wheel shop, and will pay for itself in a short time.

The tight and loose pulleys are ten inches in diameter and five-inch face, and should make 780 revolutions per minute.



Improved Bevel Felloe Planer.

(FOR TAPERING BENT RIMS.)

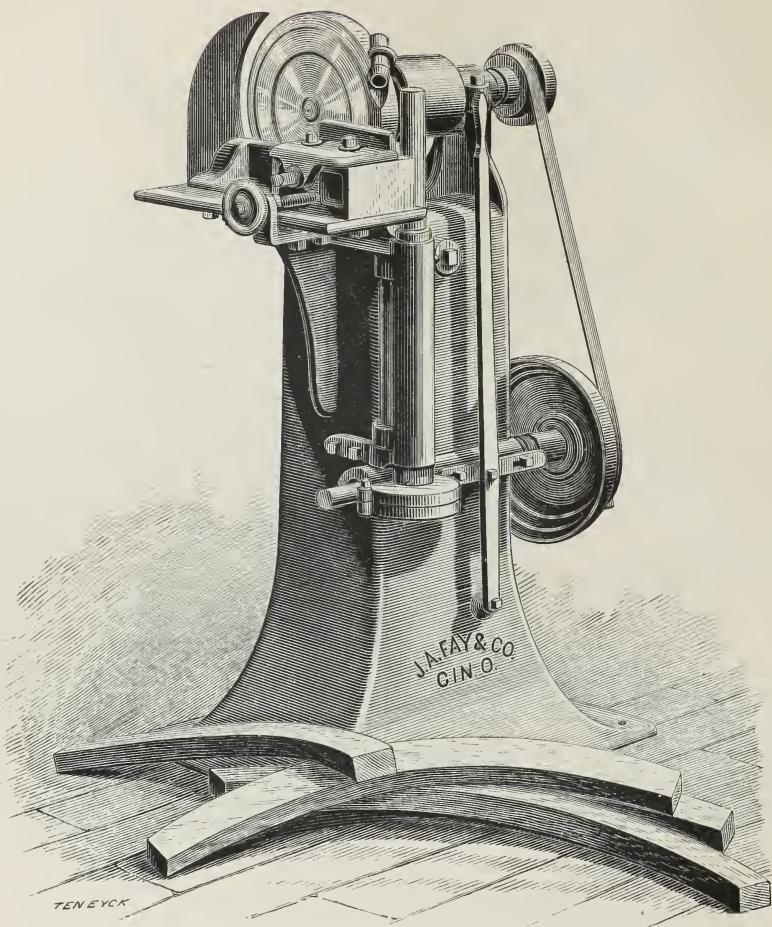
This machine planes at one operation both sides of felloes or bent rims, either square or beveling, as may be desired, and performs the work much more rapidly, and almost as smoothly, as can be done by hand.

It can be easily adjusted to different sizes of felloes and rims, from one bevel to another, or from square to bevel work, and effects a great saving of hand labor, it being calculated that one machine will save the labor of six finishers in a factory turning out fifty sets of wheels per day.

It bevels the rims before they are rounded inside, allowing the sand belts to finish the work which has to be done by hand when the rim is put on before being beveled. It also saves the operation of one or two other machines, no other work being required on the side of the felloes after passing through this machine.

It has a very strong feed easily regulated, the spindle and cutter heads are made of steel, the boxes are self-oiling, and it will be found durable and effective in all its parts.

The tight and loose pulleys are eight inches in diameter and four-inch face, and should make 750 revolutions per minute.



Vertical Felloe Planer.

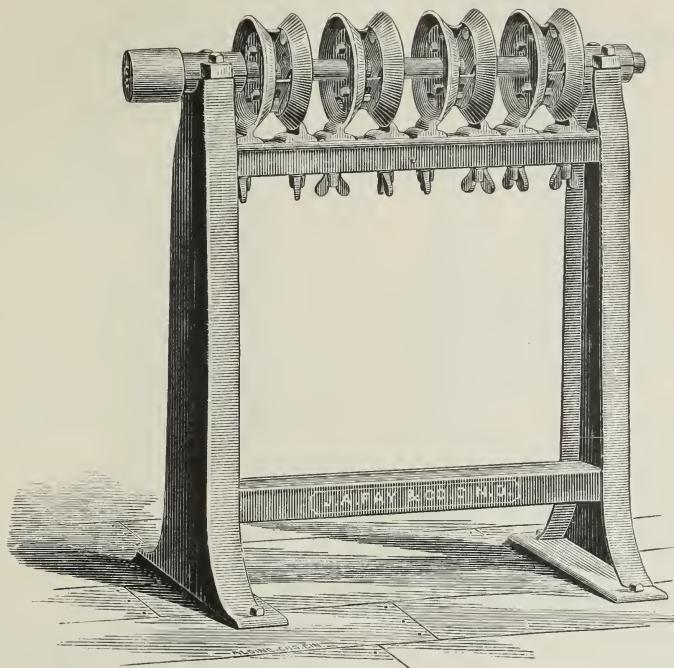
This machine has a circular disk set vertically to the stuff to be planed. It is adaptable to many classes of work, and will plane straight and tapering, square up, and take out of wind.

It can be arranged for circular work, as on the various kinds of felloe planing, or work of a similar character, and is a valuable machine for carriage and wagon manufacturers, builders, cabinet makers, etc.

The cutting disk is provided with bits for finishing the lumber to a smooth surface. The feeding roller receives its pressure from a spring, and is provided with three speeds of feed.

The thickness of the stuff is regulated by a sliding fence operated by a hand wheel. Special arrangements are attached for felloe and circular work. The head should make 2,500 revolutions per minute.

The tight and loose pulley, if a countershaft is wanted, will be ten inches in diameter and five-inch face, and should make 625 revolutions per minute.



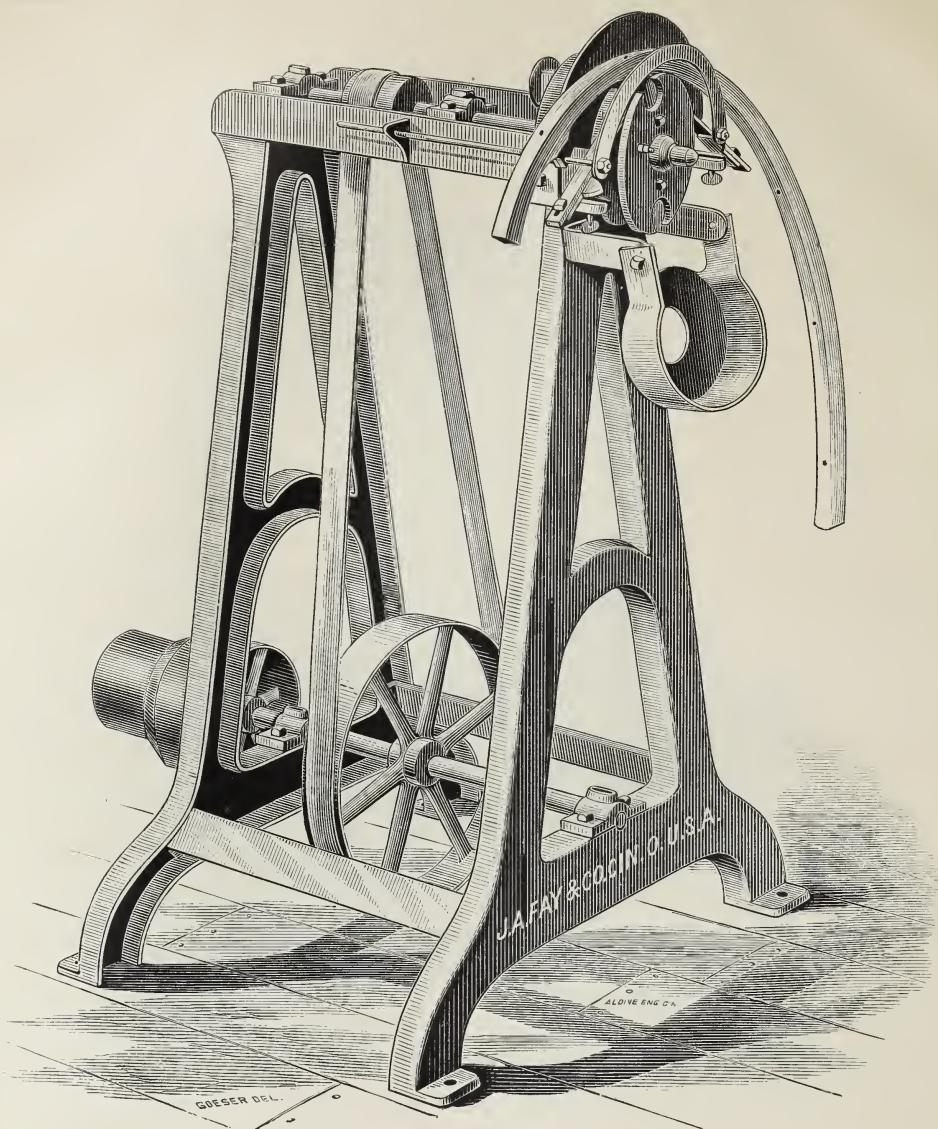
Special Cornering or Rounding Machine.

This is a simple and substantial machine for cornering work preparatory to placing it on the sand belt, and is adapted to rounding all classes of carriage and agricultural implement work, or anything of corresponding character.

It works with great rapidity and certainty, and will not only perform triple the amount of work of a shaper, but dispenses with the necessity of patterns. A boy can operate it, and for the purposes designed it has no equal.

The several heads on the spindle are each provided with different shaped cutters, according to the work to be done. The amount of the corner to be taken off is governed by the distance the bevel guards are set apart, they being adjustable, and retained in their position by a set screw in the foot of each. A chamfer of any bevel may be made by having the guards of a bevel to correspond to it.

The pulley on the spindle is three and one-half inches in diameter and four-inch face, and should make 4,800 revolutions per minute.



Felloe Rounding Machine.

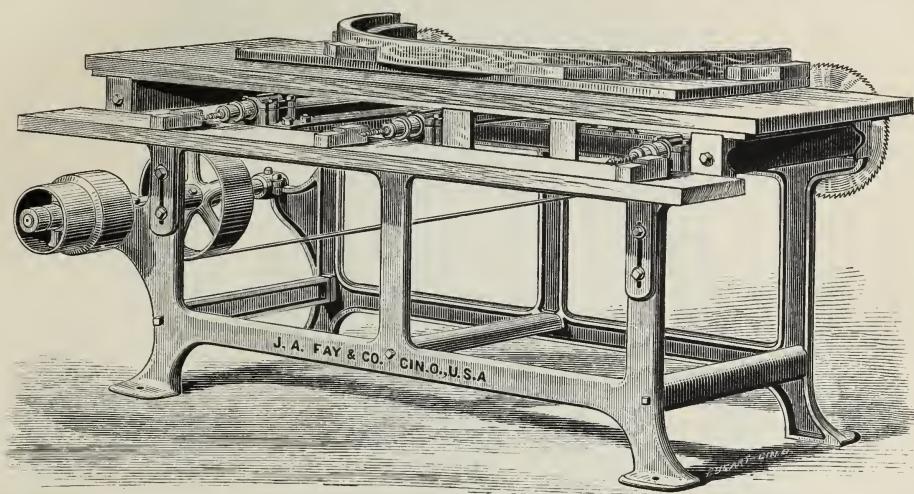
This machine is designed for cornering and finishing the inner curve of the felloes of wheels, after they are bent and bored for the spoke. The cutters are placed in an adjustable head, their edges made so as to form a semi-circular groove in their periphery.

Between the heads is a stationary guide rest to prevent the felloe from being cut away more than required. Upon the periphery of the rest is a gauge and pin for regulating the distance from the spokes at which the cutting of the corners shall begin, a portion of the felloe about each spoke being left square.

In operating the felloe is passed through the cutters with the pin in one of the spoke holes and then moved outward until it presses upon the rest and catches the next hole upon the pin, and so on until the whole of the piece is rounded upon one side, and all the spoke holes full half way to the succeeding holes, when the stick is reversed and the process repeated, completing the operation.

The felloe is easily secured in the center of the cutter-head and the guides are adjustable for felloes of different thicknesses. For very great differences other guides can be used.

A countershaft is connected with the machine, having tight and loose pulleys, which are eight inches in diameter, three-inch face, and should make 600 revolutions per minute.



Felloe Boring, Cutting-Off, and Dowelling Machine.

This is a very convenient and simple machine, intended for sawing off both ends of felloes to the proper size; also for boring holes for the round tenons, and making the dowels in the ends of same.

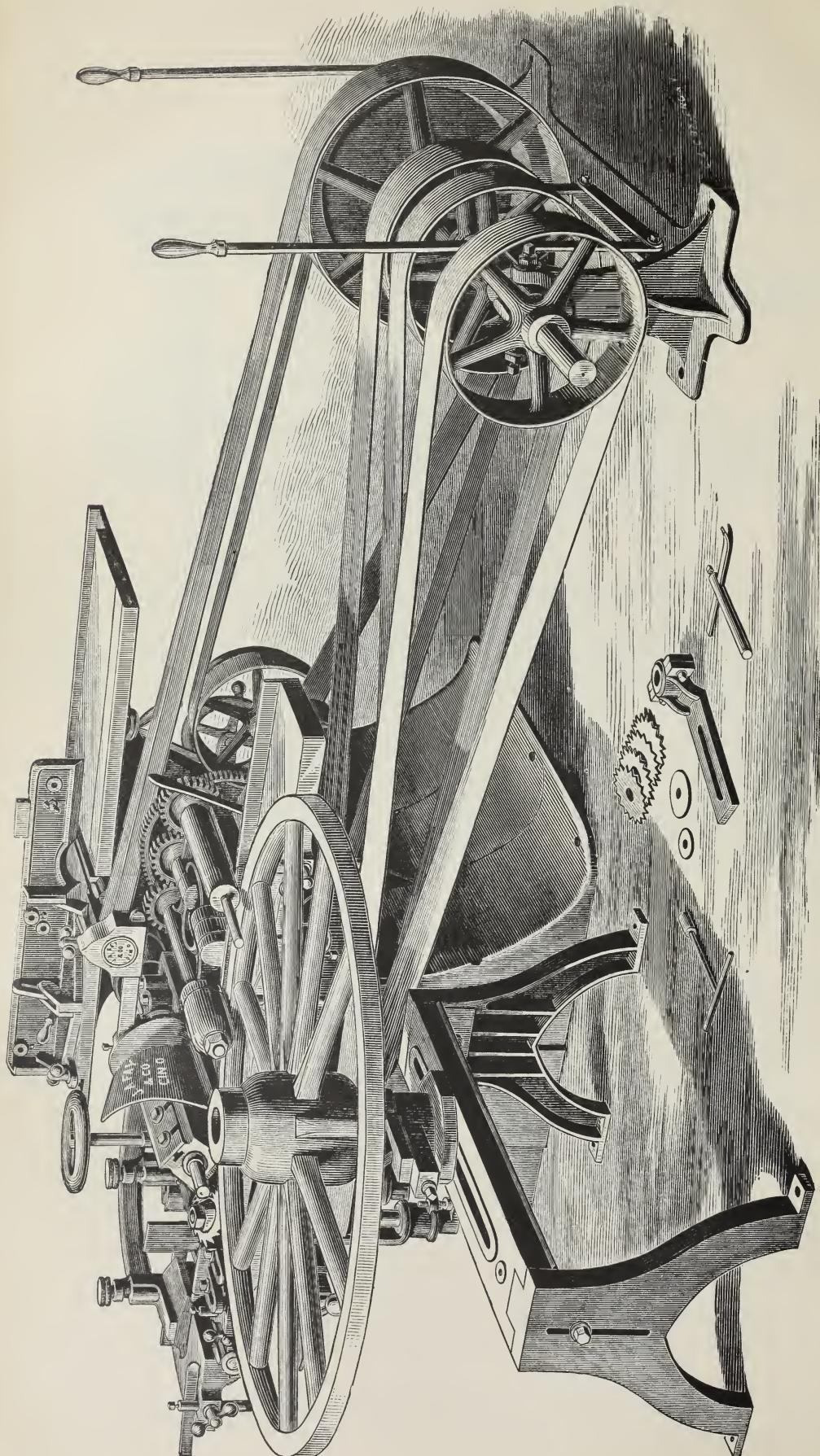
It is built on a substantial iron frame, with the arbors extending across the machine from one side to the other. On the front side the two outer arbors carry each a circular saw, which projects through the table, on which there is a supplemental table with forms to suit the circle of felloe to be worked.

This table slides on the main table carrying the ends of the felloe past the saws, reducing both ends to a uniform length by a slight motion of the carriage.

On the opposite side are the boring arbors, three in number. On this side the holes are bored in the felloe for the round tenon on the end of the spoke; also the dowel holes in the ends of the felloes.

There are adjustable stops for the different thicknesses of felloes, and the table has a vertical adjustment also.

The machine has a countershaft, which drives all the arbors, and carries tight and loose pulleys, which are eight inches in diameter and five-inch face, and should make 900 revolutions per minute.



Universal Wheel Finishing Machine.

(FOR DRESSING BOTH TREAD AND FACE OF WHEEL.)

Universal Wheel Finishing Machine.

(FOR DRESSING BOTH TREAD AND FACE OF WHEELS.)

This is a useful combination, made with our universal wood-worker, designed to finish the rims, side, and tread of wheels, and is very perfect in its operation.

For bent rims, the outside can be made a true circle, but for sawed felloes the joints are liable to crush, making a depression. This is avoided by making the felloes of a larger circle than the circle of the wheel, causing the joints to stand out, so that when the tire is placed on the wheel it forms a perfect circle.

In planing wheels with sawed felloes, the hub is placed in a screw chuck on a stand with adjustments for angles, distances, and height. The chuck is made with a cam attached to correspond to the number of felloes on the wheel, and the proper shape to give the required circle to the felloes.

The outside head is of peculiar construction, cutting against and with the grain of the wood equally well. The main head of the machine faces the side of the wheel which may be up.

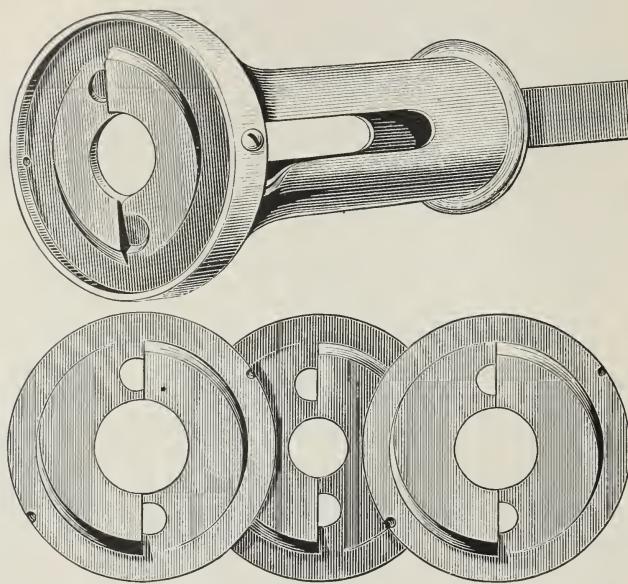
The feeding roller carries the wheel around against the cutters and holds the cam against the guide roller and finishes the side and periphery at one operation.

For bent rims, a true circle may be used in the chuck instead of the cam. The wheel planing arrangement can be detached easily and quickly, and the heads, feed rollers, and outside bearing for the molder side of the universal wood-worker replaced, on which moldings to eight inches can be made, it being furnished with all attachments necessary for that work.

The wood-worker side is complete for squaring up and truing to nine inches wide, gaining, grooving, rabbeting, and all work usually done on machines of its class, as described in our wood-worker articles. In addition, attachments can be put on for sawing off and boring felloes.

This machine is complete in all respects. Both sides can be operated at the same time, or either stopped without interfering with the other, making the operators entirely independent of each other.

The tight and loose pulleys on the countershaft are twelve inches in diameter and five-inch face, and should make 600 revolutions per minute.



Corr's Improved Hollow Auger.

(WITH INTERCHANGEABLE CUTTERS AND BITS.)

The above engraving represents an improved hollow auger, intended for making the round tenon on spokes after they are driven into the wheel. They can be furnished with a square shank, permitting their use in an ordinary wheel-wright's brace, worked by hand, or can be applied to power machines.

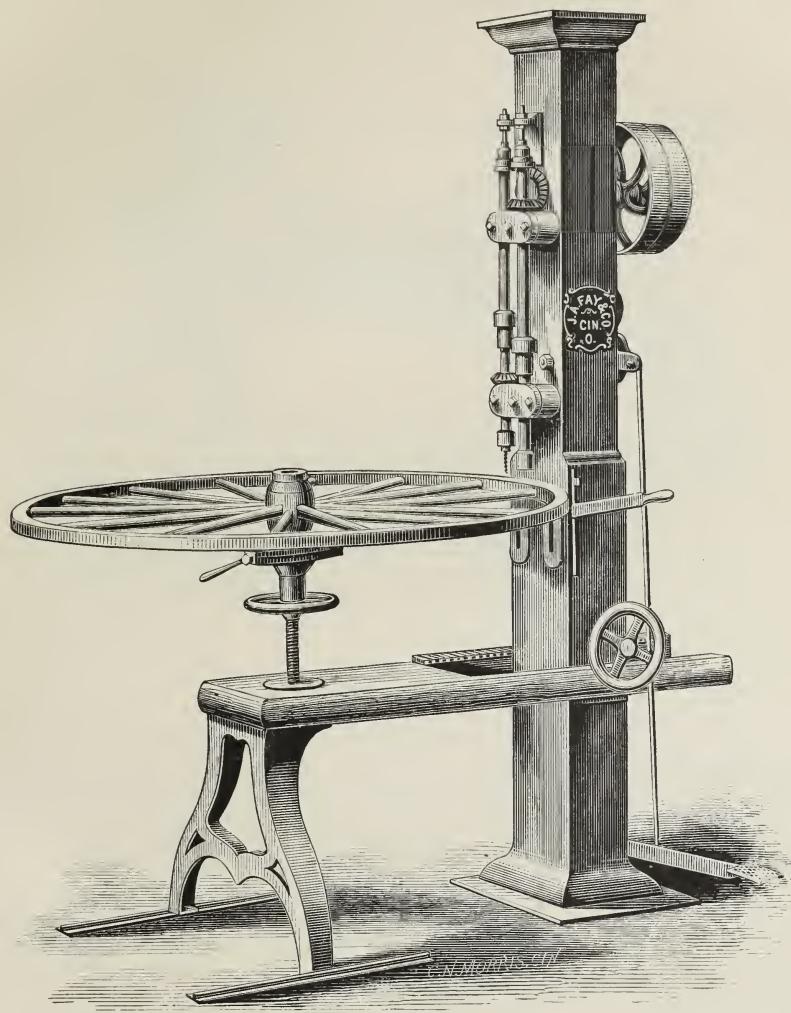
It is a very simple and effective tool. The cutters of the augers or chuck are made of steel, the face of the chuck being recessed for the reception of the cutters, which can be almost instantly interchanged from one size of tenon to another without removal from the machine.

The bits are made of very heavy steel, forged under a drop with the cutting lips raised in such a way as to get a shearing cut on both corners, and allow of sharpening with a file.

The size of the tenon is never changed by sharpening the cutters. When provided with a suitable assortment of cutters, it will be found to answer all the purposes of the expansive augers, or even a full set of the ordinary hollow augers.

Its chief points of advantage are

- 1st. Its remarkable simplicity of construction.
- 2nd. Its cheapness when compared with all expansive augers in use.
- 3rd. Its durability, cutters not being so liable to get out of repair as other augers.
- 4th. The facility with which it can be changed for different sized tenons.
- 5th. Its perfect accuracy in producing tenons without the slightest variation from the use or wearing away of the cutters, so common with ordinary hollow augers.



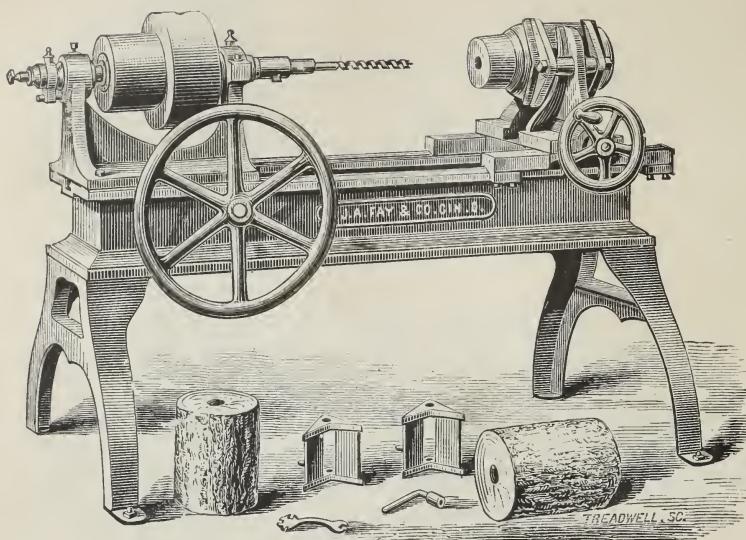
Wheel Screwing Machine.

This is an improved machine for boring the holes and driving the screw in the rims or felloes of wheels, to prevent them from splitting or cracking where the spokes enter. It has two spindles running at different speeds, that which runs at the highest speed carrying an auger for boring the holes. The other spindle is cupped out in the lower end and split, in which is clamped a strip of steel for driving the screws, the cup serving to guide the screw-heads to the driver.

The wheels are held in a chuck, which is raised or lowered, to suit different lengths of hubs, by a screw and hand-wheel, and brought to or from the machine, to accommodate different sizes of wheels, by means of rack and pinion. This frame traverses on two slides fastened to the floor.

The belt which drives the boring spindle is slack enough to allow the spindle to stop when the foot is taken off the treadle. The other spindle runs constantly with the countershaft.

The tight and loose pulleys on the countershaft are twelve inches in diameter, and three-inch face, and should make 400 revolutions per minute.



Hub Boring Machine.

This machine is arranged for boring the hole through the center of either large or small hubs. The hub is held between two jaws, which are self-centering, and moved together or separated by a right and left screw, worked by a hand wheel.

The ways upon which the jaws are moved are planed perfectly true, and the frame upon which the ways are cast is placed upon parallel planed ways upon which it slides, when the hub is being moved to the auger while boring.

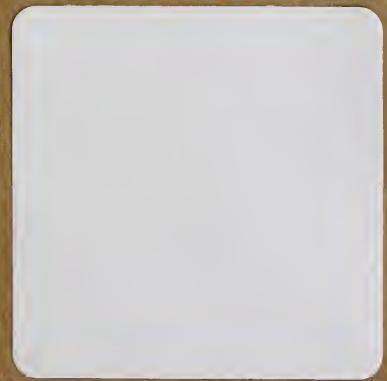
The movement of the hub is effected by a rack, attached to the sliding frame; the rack is moved by a pinion on the shaft of the large hand-wheel.

The boring mandrel is driven by a two speed cone pulley. The bearings in which the mandrel runs, are the same described for the Victor Wood Lathe, and are thoroughly arranged for oiling and reducing friction.

The machine is placed upon a substantial frame and is well finished throughout.

Two pairs of jaws are sent with each machine.

The tight and loose pulleys on countershaft are twelve inches in diameter, five-inch face, and should make 750 revolutions per minute.



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